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ABSTRACT

Six papers on educational management systems and indicators development are presented in this document. Research was conducted under the Improving the Efficiency of Educational Systems (IEES) Project, which provided assistance in several countries, some of which include Indonesia, Botswana, Haiti, Guinea, and Nepal. The papers include: "Collaborative Design of Educational Indicator Systems in Developing Countries: An Interim Report on an IEES Project Initiative," by Peter A. Easton, Dwight R. Holmes, C. Howard Williams, and Joy duPlessis; "The Role of Educational Management Information Systems and Indicators in the Operationalization of the Concept of Educational Efficiency: Eight Years of IEES Project Experience," by Dwight R. Holmes; "Planning and Implementing an Educational Management Information System: The Case of Botswana," by Shirley A. Burchfield; "The Development of an Educational Information System: The Case of Nepal," by C. Howard Williams; "The Identification of Indicators of Efficiency and Quality to Inform Curriculum Development and Implementation Policy," by Kent L. Noel; and "The Impact of Sectoral Adjustment on the Design and Implementation of an Educational Management System: The Case of Guinea," by Joshua Muskin. (LMI)

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Developing Educational Information Systems and the Pursuit of Efficiency in Education:

Eight Years of IEES Project Experience

Dwight R. Holmes
C. Howard Williams, Editors

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Improving the Efficiency of Educational Systems (IEES) is a ten-year initiative funded by the Agency for International Development (AID), Bureau for Science and Technology, Office of Education. The principal goals of the IEES Project are to help developing countries improve the performance of their educational systems and strengthen their capabilities for educational planning, management, and research. To achieve these goals, a consortium of U.S. institutions works collaboratively with host governments and USAID Missions. The IEES Consortium consists of The Florida State University (prime contractor), the Institute for International Research, and the State University of New York at Albany.

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Developing educational information systems and the pursuit of efficiency in education: Eight years of IEES Project experience

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PREFACE

Over the last decade, educational development programs increasingly have included information systems as an integral component. It has become increasingly espoused, if not accepted that effective educational planning and development is predicted on collecting and using representative, quality data. The focus by many education and development agencies on Education Management Information Systems (EMIS's) and educational indicators underscores this fact.

Though selective and abstract by their nature, EMIS's and indicators are an attempt to bring more complete data-based observations of the educational enterprise, or certain of its aspects, to policy makers, program managers, and other stakeholders. An EMIS is expected to provide regular, timely information on project or program status and implementation for management monitoring, decisions and actions. This type of system requires a fairly deep level of trained personnel and technology, and a commitment to assign those resources to the task of developing and maintaining the EMIS. Indicator sets can provide a more comprehensive picture of the system, including trends, problem areas, and opportunities. Indicator sets also can highlight the need for action research or case studies, to fill qualitative gaps in national data systems.

The collection of papers in this volume represents experience in EMIS and indicators development, conducted under the Improving the Efficiency of Educational Systems (IEES) Project. IEES Project assistance in information systems development has been undertaken in several countries, notably Indonesia, Botswana, Haiti, Guinea and Nepal. The information systems which are being developed in these countries vary in their context, purpose, scope, methodology, and selection of indicators and data. Consequently, the cases presented in this book offer a range of experiences, more than implementation of a single model in multiple sites.

The first paper, by Peter Easton, Dwight Holmes, Howard Williams, and Joy duPlessis, sets the theoretical background and framework for IEES Project work in the area of efficiency indicators. The development of the prototype education system model which is referred to in the case studies in this volume is described in this paper. A brief review of the literature in educational indicators in both the international and U.S. domestic arenas is included, along with conceptual exploration of key terms such as educational efficiency, educational quality, and indicators. Potential uses of "indicator systems," along with several caveats, are outlined, and a series of follow-up studies is proposed.

In the second paper, the evolution of the "efficiency concept," as operationalized by the IEES Project, is presented by Dwight Holmes. The work described in the first paper is placed in historical context within the IEES Project along with other, parallel activities which have been undertaken. The elaboration and promotion of "efficiency" has been fundamental to major IEES initiatives, such as the extensive use of Sector Assessments, academic work, particularly by Douglas Windham and David Chapman, and IEES activities such as policy analysis training, and development of EMIS' and national education indicator sets.

Holmes' description of IEES' efficiency-oriented project activities appears to indicate an evolutionary program along very definite lines. As Holmes points out, however, this evolution has been largely dependent on country contexts, the initiative of participating individuals, and emergent opportunities. The theme of efficiency runs throughout. Yet greater care should be given to coherency and integrity of the activities, not to ensure the sanctity of efficiency, but to build upon these experiences. Holmes also highlights the need for an ancillary theme for efficiency initiatives: That, if the efficiency concept is to provide useful guidance for data-based policy and program decisions, then those decisions need to be continually linked to improvements at the level of educational delivery.

In the case of Botswana, computer-based EMIS's have been developed in several Ministry of Education departments, including Planning, Bursaries, Teaching Service, Primary, Secondary, and Non-formal Education. Shirley Burchfield describes the need for coordination of these databases, and the strategy used for unifying the constituent data-bases into a system-wide data-base, allowing for overall system monitoring and efficiency analysis.

In consultation with the departmental data-base managers and senior education officials, it was agreed that a model of educational efficiency indicators would best suit the need for a system-wide data-base. Burchfield describes the processes of indicator selection, data collection and analysis, and the technical,methodological, and organizational issues involved. Burchfield's presentation also includes a listing of the efficiency indicators, and the system computer screens, illustrating how this system has been computerized.

The paper by Howard Williams is a reflective description of educational information system development in Nepal. The educational information system is comprised of a Statistical Information System (SIS), action research, educational indicators, and evaluation standards. In developing this system, an organization development (OD) approach has been used, in order to assess what educational information and systems would be of most value and use to the Ministry of Education, under current circumstances.

Each of the components of the information system is recognizable by its own conceptual base, methodology, and techniques. Yet no single component is a wholly complete, stand-alone operation, aside from the basic SIS already established by the alone operation, aside from the basic SIS already established by the Ministry. Instead, the consultative, interactive relationship used in the OD approach has produced a configuration of information functions and activities which appear to be most valuable and useful.

In the next paper, Kent Noel presents an adaption of an indicator model for use in curriculum development and institutionalization in Botswana. Noel argues that curriculum development should be considered as a critical subsystem, with the attendant considerations normally given to the sector as a whole, such as: power sharing, communication and consultation, lines of authority for decision-making, production, and delivery, management and supervision. Consequently, subsystems, such as curriculum development, warrant full performance information systems, such as the EMIS and indicator systems now being developed for the national education system.

Based on six-years of experience with national curriculum development, Noel proposes a schematic outline of policy and management information issues to be addressed, including information clientele, EMIS components, data requirements, and suggested indicators. Noel's model follows the framework used for the national system in Botswana, but necessarily reflects the particular characteristics of curriculum development.

Finally, in the case of Guinea, presented by Josh Muskin, system indicators and an EMIS are being developed in conjunction with "conditionalities" for sectoral assistance. The Government of Guinea, and the participating donor agencies, The World Bank, United States Agency for International Development (USAID), and the French Government's Fond d'Aide at de Cooperation (FAC) have developed an educational sector reform program to improve quality, access and management. The "conditionalities" serve as interim implementation targets, which must be met for continued funding of the reform.

Muskin expresses his concern that the conditionalities, and their system indicators, could become ultimate goals for organizational performance, rather than serving as guideposts for the vision and achievement of reform, which is to deliver a higher quality education to more Guinean children. To mitigate against the organizational tendency of servicing the indicators instead of system clients, Muskin proposes a consultative approach to developing an EMIS, to improve the chances that the EMIS will better represent reform goals of service delivery, rather than being a reporting system for periodic funding.

Earlier drafts of each of these papers were presented at annual meetings of the Comparative & International Education Society: The paper by Easton et al., was presented at the 1991 meeting at the University of Pittsburgh, while the remaining five papers were presented as part of the panel on "The Development and Use of Educational Data for Making Policy Decisions to Improve the Quality and Efficiency of Education" at the 1992 meeting, held in Annapolis, Maryland. The authors wish to thank Richard Pelczar, IEES contract manager, USAID/Washington, for his encouraging and critical support for these various efforts. Thanks are also extended to Simon Ju, IEES/Indonesia, for the guidance of his extensive work in information systems, and for his review of these papers.

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Collaborative Design of Educational Indicator Systems in Developing Countries: An Interim Report on an IEES Project Initiative

Peter A. Easton, Dwight R. Holmes, C. Howard Williams & Joy duPlessis

INTRODUCTION

The design of educational indicator systems is presently a "hot topic" in both the industrial and developing worlds (Bottani & Delfau, 1990; Chapman, 1990; Odden, 1990; Windham, 1988a, 1988b) as better use of existing data at all levels holds out the hope of rationalizing the macro-management of educational systems and directing attention to the real impediments to improved performance and greater equity.

IEES Project activities in this domain were born of some related concerns, though ones that changed form significantly in the course of implementation. Evaluation of the first five years of IEES Project activity suggested a number of positive effects, but also a need to better document project impacts and the evolution of the baseline situation and socio-economic environment of the educational systems in question. Project staff therefore decided to begin work on a prototype indicator system for tracking the overall state of the education systems in participating countries, in part as an ongoing and greatly simplified form of sector assessment.

Once the team responsible for this effort began to bring together current research and thinking on indicator systems with its own experience in educational data use in developing countries, it quickly became clear that an additional two dimensions would be needed: First, incorporation into the model of qualitative data on educational processes, habitually the weak point of indicator systems; and, second, major and structural provision for host country counterpart participation in indicator system design and data definition, as well as anticipation of considerable variance and country specificity in design characteristics.

In the rest of this paper, we briefly describe our conceptual analysis of educational indicator systems, the prototype model of primary education developed, and the process envisaged (and now underway) for host country elaboration and modification of the model. We will also discuss the potential for utilizing the indicator system both for in-country educational planning and staff training purposes.

II. CONCEPTUAL ANALYSIS OF EDUCATIONAL INDICATOR SYSTEMS

A. The Nature of Indicators and Indicator Systems

Recently there has appeared an increasing amount of literature about indicators for educational systems, provoked by concern with educational accountability in this country and spearheaded by the OECD Indicators Project in the rest of the industrialized world, as well as by donors' attempts to improve educational management and soften the blow of diminished educational resources in less-developed countries (LDCs).

There is no uniform definition of the notion of an "indicator," however. Chapman (1990, p. 229) terms indicators "proxies used to represent the underlying reality of a system or program" and notes that they are necessarily an "oversimplification" of this reality. Cobbe (1989, p. 3) makes a distinction in his monograph between raw data, statistics and indicators, noting that the latter "should permit immediate -- or nearly immediate -- inferences about the performance of the [educational] system from the point of view of the objectives of the system."

Oakes (1986) defines an educational indicator as "a statistic about the educational system that reveals something about its performance or health"; and Smith (1988) further suggests that it "either assesses or is related to a desired outcome of the education system or describes a core feature of that system." Odden (1990, p. 24) points out that an "indicator **system**" is considerably more than a single indicator or statistic. It should provide measures of various components of the educational system as well as information about how those components work together to produce the condition of the system and changes in the condition of the system over time.

Most researchers identify indicators with **composite** indices of the operations of the educational system designed to reveal some critical aspect of its operation. Johnstone (1984) goes so far as to restrict the term to rather complex compounds of data providing a highly synthetic picture of the system.

Such an approach seems unnecessarily restrictive, however. The essential notion is simply that of particularly meaningful data that point to and describe a significant characteristic of the educational system. In some cases, a single type of data may do this (Nuttall [1990] calls these "primary indicators"); in other cases, more processed composites of raw data or statistics may be used ("secondary indicators," in Nuttall's parlance). In all cases, commentators tend to emphasize the fact that, as Bottani (1990, p. 337) puts it, "indicators do not explain; they only point." Some additional resources must be called upon in order to **interpret** the data that an indicator system produces.

B. What is Worth Indicating?

If indicator systems only point, what are we pointing at? From a generic and "rational" point of view, the underlying concern in indicator system development seems to lie with discovering

whether and how -- or "to what degree" and "in what way" -- the educational system is accomplishing its goals. Since those goals will generally be quite country-specific, and given that there is often considerable debate within a country as to what those goals ought to be, it follows that indicator systems may also need to be quite idiosyncratic and subject to modification, a tendency tempered only by some measure of concern with consistency and comparison over space and time.

At the same time, it is evident that the IEES Project, like other multinational endeavors of donor agencies, is predicated on the notion that there are some universal criteria of educational system performance, related in particular to issues of efficiency and quality. How universal are these criteria and how much uniformity can or should they lend to a multinational indicators project?

Educational Efficiency: Efficiency in the delivery of educational services is a central concern of the IEES Project. It is the Project's "middle name." A good deal of conceptual work has been done on the topic under the aegis of the project, particularly the substantial monographs by Windham (1988a, 1988b). Much of that analysis is implicitly adopted here. At the same time, we feel constrained to note that injunctions to maximize the ratio of educational outputs or outcomes to educational inputs frequently glaze over three fundamental issues:

First, technically speaking, the **concept of efficiency is only meaningful if you correctly specify** (and measure) **the outputs or outcomes in question**. Desired educational outputs and outcomes are not simple, and they may vary significantly from one country or region to another. They may involve affective as well as cognitive results, group as well as individual effects, and distributional as well as summational considerations. Policy makers may in reality be trying to maximize an entire vector or set of outcomes -- Windham refers to it as the outcome "mix", -- including (conceivably) the **desideratum** that the relative position of one group improve relative to that of another. Issues like these are often circumvented by imposing at the outset a conventional series of objectives and desired outcomes -- generally those in vogue with major donors.

Second, **efficiency is a ratio, not an absolute magnitude**. Applying the perfect competition and general equilibrium postulates of neoclassical economics, it is generally assumed that efficient methods that are applicable at one resource level are generalizable across others as well. This may not be true; and, if not, the reasoning is in serious trouble. Also, for related reasons, as Cobbe (1989) points out, an efficiency criterion can be substantively ambiguous, particularly if a short-term view is adopted. For example, cutting inputs by one-half might "mathematically" improve efficiency in short-run perspective, yet have ruinous longer-term effects.

Third, **educational systems need to be efficient both in generating AND in expending resources**, and these two objectives are not always perfectly compatible. A system which produces less outputs per unit of input but manages to generate or elicit more input -- e.g., community or private financing -- may be better adapted to accomplishing national objectives than a more "efficient" one. In a sense, this point mirrors the economic distinction between

technical and allocative efficiency, since the latter takes account of the relative prices of inputs and outputs and therefore the valuation that (public or private) consumers place on educational system performance.

Overall, Windham suggests that "the efficiency concept is a neutral device" (1988, p. 9), but that **only** holds under one of two very restrictive conditions: (1) if the term is given no content, in which case it is operationally useless; or (2) if there is substantial agreement among all stakeholders concerning the objectives or the "outputs" that are being maximized. To make the concept operational, some set of objectives or desired outputs must be specified; and the question then immediately becomes "Whose objectives? Desired by whom?"

Educational Quality: Fuller (1986) chronicles four different phases in the definition of educational "quality" -- from an initial stress on the mix of material outputs, through a period of increased emphasis on the importance of individual abilities and perceptions, to a phase of growing awareness of the centrality of cultural and social patterns that shape school process, and on to more recent awareness of the non-school-related and political objectives that "educational quality" campaigns may fulfill. Cobbe (1988, p. 3) identifies educational quality with the "value added" by the system, though this makes it nearly synonymous with the efficiency concepts discussed above.

Easton and Cayhana's paper on the efficiency and quality of technical education in Indonesia (Easton & Cayhana, 1989, pp. 3-4) notes two main tendencies in efforts to operationalize the notion of educational quality:

On the one hand, quality is defined as embodiment or approximation of characteristics that are socially accepted as proof of excellence. Thus, if all teachers in an academic secondary school have Master's degrees, the group will be considered a high quality staff. One the other hand, quality is defined as proven ability to produce results -- in short, the argument that 'a tree is known by its fruits.'

Moreover, "educational quality" in the former sense is very often invoked in evaluations and policy studies for two reasons worth noting: First, as a substitute or proxy for efficiency measures, because genuine output data are so frequently unavailable; and second, because this open-ended concept is felt to capture more of the multiple and sometimes unquantifiable dimensions of educational outcomes than stricter input-output measures. Concern with educational quality therefore opens the door to the idea that other than quantitative data may need to be incorporated into an indicator system -- or used in tandem with it -- in order adequately to describe and analyze the current state of the educational system.

C. Specifying the Underlying Conceptual Model

Two points are made repeatedly in current literature on educational indicators: First, that indicators "do not explain, they simply point"; and second -- partly as a consequence -- that one needs to take some care to think out the underlying model of educational process on which the

indicators are based, and which will serve as a basis for interpreting them. The model need not be very complex. The Rand Corporation scheme presented in Odden (1990) includes only three types of inputs, four types of processes and three categories of outputs. But most authors maintain that some such model is implicit in any set of indicators anyway, and that it is therefore best to get the subject out in the open and examine it.

We concur with the need to give some careful thought to the model of educational processes that underlies an indicator system. Most IEES studies and documents employ some form of a "CIPP" framework (in fact "CIPOO" insofar as the "product" is differentiated into "output" and "outcome"). The CIPP framework is not really a model in the sense meant above, however, but simply a set of categories (based albeit on a production function analogy) for thinking about educational processes. The question remains, "What kinds of 'inputs,' 'processes,' 'outputs' and 'outcomes' will be put in the model?" and "Who will make the decision?"

D. Choosing Indicators: Criteria and Methods

The next step is choosing the specific indicators to be tracked. We feel that the choice should be made in accordance with both conceptual and practical criteria. Before discussing those criteria, however, there is a prior question concerning the "population" of possible indicators **from which** the choice will be made. In order to avoid overly or artificially constraining that initial set (and therefore all the choices made from it), we decided to inventory a large number of potential indicators, cross- classifying them by conceptual category or cluster. The choice criteria were then to be applied to this stratified grouping.

Chapman (1990, p. 229) suggests that "the appropriateness of particular indicators is judged in terms of their fidelity with the underlying reality they represent, the extent to which the indicators are relevant and understandable by the data users, and the extent to which data on these indicators can be collected and analyzed in a cost-effective manner." We attempt to include these criteria and perspectives in the discussion below.

1. Conceptual Criteria

Conceptual criteria essentially involve considerations similar to the ones governing the articulation of the underlying model. Since only a relatively few indicators will be systematically monitored, one wants to be sure that they relate to "key" aspects of the educational system. What does "key" mean, however, and who decides which indicators meet this criterion?

Considering the first question first -- we think that the word "key" essentially means that the aspects of the educational system in question are judged (by appropriate parties and in an appropriate manner) to be particularly expressive of its current state or level of quality, or particularly critical to its performance in achieving (their) priority objectives. Two technical issues are at stake here: The first concerns validity, and the second has to do with causality.

The validity question involves the degree to which the particular indicators chosen validly represent the underlying characteristic of the educational system that one wishes to measure, an argument that can be made on either conceptual (construct validity) or empirical (concurrent validity) grounds. The causality issue concerns the degree to which these underlying characteristics are in fact related in some cause-and-effect manner to achievement of the given system performance objectives.

On both grounds, we can use -- though advisedly -- some of the literature reviewed by Fuller (1986, 1987) and others that seeks to identify key factors in improving educational quality in LDC schools. Obviously research on the countries in question has the greatest face validity, but is frequently hard to come by.

2. Practical Criteria

Practical criteria to use in choosing indicators are essentially of two kinds: (1) data availability considerations, and (2) data quality considerations. They will be broached in that order.

Data availability considerations are relatively straightforward, but are nonetheless worth careful examination. From the point of view of a centrally-administered international project, one could establish a hierarchy from "more to less available" with gradations something like the following:

(a) Available in easily accessed international publications.
(b) Available in more remote international publications.
(c) Available in easily-accessed international data bases.
(d) Available in national publications easily accessed in-country.
(e) Available in national publications requiring specially-authorized access in-country.
(f) Available in international data bases requiring special search or access.
(g) Available in national data bases requiring special search or access in-country.
(h) Available in-country in dispersed or raw data form requiring considerable collection or collation effort.

The order and relevance of this scale is obviously different if one is situated at the national or regional level, and appropriate changes should be made. In any case, there is some implicit rank order of availability characterizing the different forms of data that one might want to include in an indicator system.

Note that the time period must also be specified in determining availability. Data for a given indicator may be fairly accessible for the 1988-90 time period, for example, but much more difficult to obtain for the 1984-87 period.

Data quality: This is both the most critical and the touchiest practical criterion, it seems to us, a problem of major dimensions that is nonetheless carefully skirted in most discussions of educational indicators or management information systems in LDCs. The issue can be politically

sensitive, but it is also absolutely central to the development of any tracking system. The articles of Chapman (1990) and Chapman & Boyd (1988) are among the very few writings we have found to treat the topic straight-on, though the authors limit themselves to a particular technical treatment of the issue.

The underlying question concerns the **margin of error** in data; and the basic principle to assert, we feel, is that **all** information contains elements of error, and any responsible presentation of data should include an estimate of this margin or at least a discussion of the sources of error. The underlying types of error are threefold, and can moreover compound each other: Reliability, validity, and sampling (representivity). Validity errors have already been discussed. We briefly consider the other two types in the following paragraphs.

Reliability: Missing information, fanciful estimates, miscopying, falsifications, misunderstanding of instruments, and a legion of other miscues increase the margin of error in the data (or, technically speaking, increase the variation that would be found in the results of successive efforts to determine the same information by separate means). It is important to get some handle on this issue.

In a certain sense, the problem may be compounded by the use of composite indicators. (e.g., if our estimate of enrollments has a margin of error of +/- 10% and our information on numbers of classrooms has a +/- 20% confidence interval, the range for the pupil/classroom ratio computed from this data could vary by as much as +/- 29% around the true value.)

Representivity or sampling error: What population do the data represent with reasonable accuracy? Often data presented as national in scope have only been collected on a distinctly non-random subset of locations or units, perhaps because of poor response rates. This situation does not necessarily invalidate the information in and of itself. Decent data on a particular subset (which is usually representative of **something**, even if not of the whole country) is immensely better than no data, and may be very informative, provided that one takes account of its limitations.

At first glance, it might seem impossible to get information on -- and take account of -- these sources and margins of error. Given that the whole topic has potential for undermining the credibility of any information system, one could then understand the inclination to scrupulously ignore it. But the main point is simply to refrain from throwing the baby out with the bath water; or, as the French say, to remember that "the best is an enemy of the good." The main point is to start taking **some** account of sources and margins of error, to be ready to exclude the data that seems most suspect in this regard, and to begin pushing for inclusion of margin of error information along with any data collection or analysis activity.

E. Whose Conception?

A number of critical questions arise throughout the foregoing reflection on the conceptual framework and practical guidelines for devising an indicator system: Namely, **whose** conceptual

framework shall underlie the indicator system? **how** shall it be devised? and **who** shall specify the criteria for choosing indicators and the complementary roles of qualitative and quantitative inputs? Though there is incontestably an international language of educational planning and research currently largely dominated by economics, there are a number of reasons to assert that actual indicator systems may and should vary significantly by locality.

The first reason is that, as noted above, efficiency has little meaning until operationalized by the specification of objectives, and those largely depend on the development strategy and perspectives of the countries in question. The second is that actual data availability may vary enormously as a function of other conditions within the host country environment. A third is that the ultimate utility of an indicator system depends entirely on one's ability to **interpret** the data, and most indicator systems therefore require a complementary set of qualitative insights that are normally highly country-specific.

To the degree that there is effective host country participation, therefore, the potential for variation in the indicators from one country to another will significantly increase, even though there certainly are international paradigms of educational development that exert major conceptual influence nearly everywhere. Moreover, there is also a potential here for variation **over time**. The notion of a key or critical aspect of an educational system has a time-bound quality and is strategy-related -- aspects that are thought to be critical at one point in time may not be at another period. The high value (and rare occurrence) of longitudinal analysis should drive proponents of the system to resist too many changes, but the likelihood of variation in data specification over time must be taken into account.

The conceptual analysis in and of itself therefore drives us to emphasize host-country participation and local "ownership" of the indicator system design process. Of course, this shift in center of gravity does not automatically answer and resolve the "cui bono?" or "who decides?" question. The same issues are simply transposed to a host-country level, and one must ask again whose criteria and conception are being used and to what degree they match those of the supposed beneficiaries or ultimate underwriters of the educational system. We will return to this topic a little further on in discussing field implementation strategy.

III. DEVELOPMENT OF A PROTOTYPE MODEL

A. Steps in the Process

Our original intention was to move from consideration of these conceptual bases to the development of a simple indicator model applicable to all IEES countries and thence to collection and analysis of data that would illuminate trends in system performance and set a framework for discussion of Project impacts. As just explained, however, we came out of the original conceptual stage with a different set of proposed orientations. At that point, the ideal procedure would seem to have been an interactive design process including substantial host-country participation from the outset. For logistic and budgetary reasons, however, this was not feasible. Our fallback strategy was to proceed with design of an initial prototype model, using

our collective field experience -- and that of the rest of IEES staff -- as a sounding board, then to treat the result as a stimulus for country-specific work and to develop a strategy for recentering the debate in host-country locations. In this section of the paper, we briefly describe the model development process and its initial results. In the next section, we turn to the question of the process for recentering the debate in participating countries.

The model elaboration process included the following steps: First, review of the theoretical bases of indicator systems and development of an initial conceptual framework. Second, inventory of potential indicators of system performance and classification into the categories of the conceptual framework. Third, choice of a set of indicators to compose the initial "indicator system." Fourth, submission of this framework to IEES staff and other colleagues for critique, discussion and modification.

This work was undertaken in the course of the 1990-1991 academic year. Candidate indicators were drawn from Windham's monographs (1988a, 1988b), sector assessment documents, World Bank and UNESCO publications, the writings of Fuller (e.g., 1986, 1987) and others on educational quality concerns in developing countries, and experience with indicator systems in Indonesia, Haiti and Botswana. To simplify the conceptual task, we based all reflection on the example of a country's primary education system.

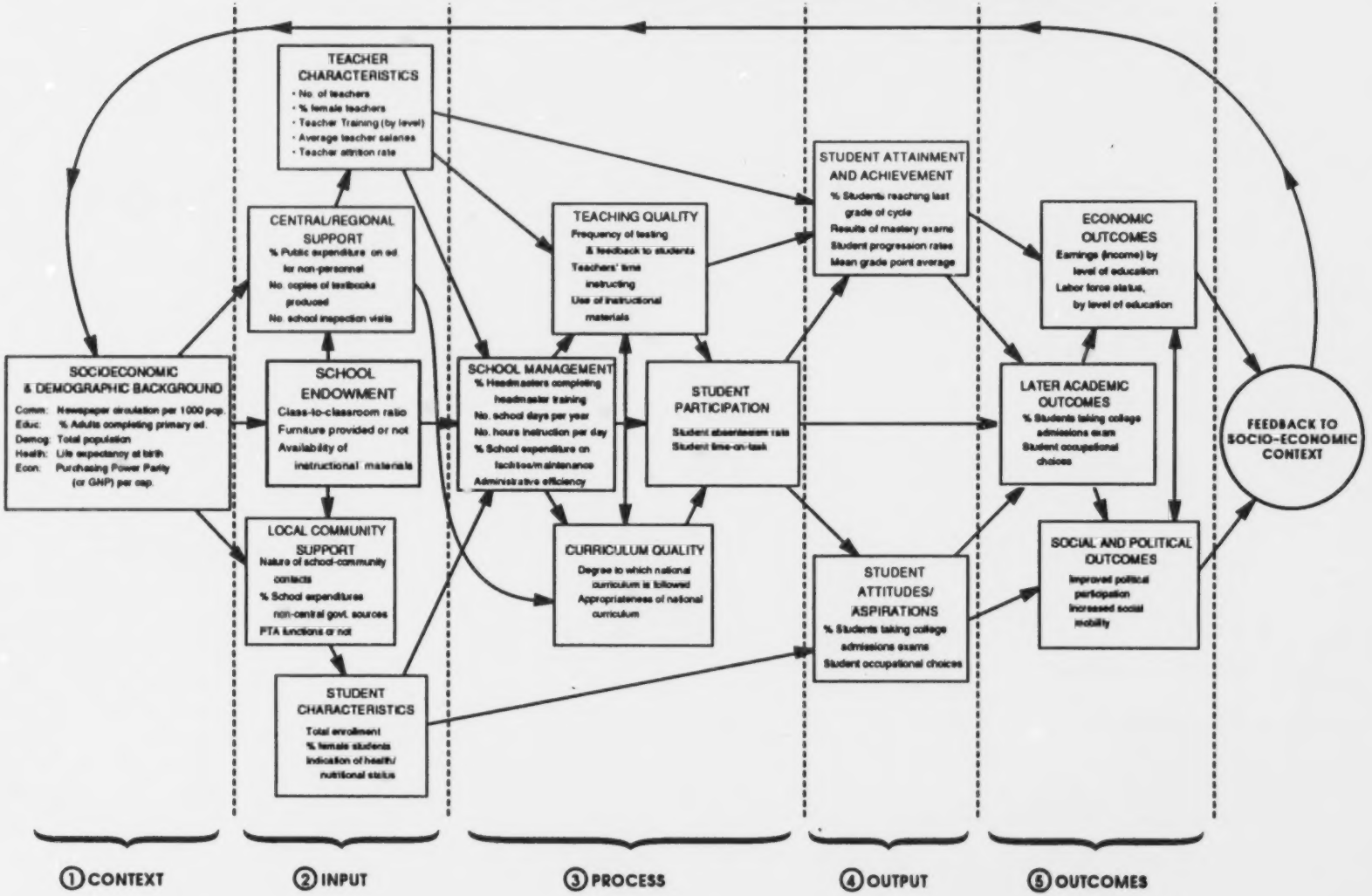
B. Initial Conceptual Model

The underlying conceptual model that we adopted was based to a certain extent on work previously done in Haiti and consists of three tiers: Descriptive indicators, efficiency indicators, and equity indicators. At the descriptive level -- portrayed on the adjoining table -- the characteristics of the educational subsystem in question are organized into fifteen domains in roughly production-function fashion: Beginning, that is, with context and proceeding through inputs, processes, outputs and outcomes of education. In an effort at simplification, we decided to choose for the initial prototype model two summary indicators per descriptive domain -- or thirty in all -- based on criteria of likely availability and relevance to overall issues of educational quality and efficiency. It subsequently proved difficult to narrow choices down this far without reference to the particular countries where the work would be done, so we retained an average of four proposed indicators per domain, counting on subsequent in-country work for refinement and pruning. The actual indicators and the rationale are laid out in Appendix A.

The next tier of the model concerns **efficiency indicators**. Strictly speaking, efficiency is a ratio of outputs to inputs. An efficiency measure is therefore generally a secondary indicator which is based on two or more primary indicators and may span across domains of a model like the one presented above for the primary education subsystem.

Each of the domains in the model may of course have its own **internal** efficiency measures, involving its own particular inputs and outputs. For example, the input to the school management domain may be dollars, and the output a certain number of services provided to teachers and students by school administration. These two measures could then be combined

TENTATIVE EDUCATIONAL SYSTEMS MODEL



into a "local" efficiency indicator concerning purely the realm of school management. For the most part, however, we are dealing with more global composite measures.

Some of the descriptive indicators included in the list above are already implicit efficiency measures. Any form of completion or graduation rate, for example, is of this nature, since the "rate" compares those who succeeded (output) to all those who took part (input). We propose in addition to track three kinds of composite efficiency indicators based on the descriptive indicators already detailed:

1. **Enrollment ratios**

Essentially total enrollment over the size of the appropriate age cohort in the population.

2. **Resource sufficiency ratios**

These include textbooks per student and non-salary expenditures per student.

3. **Resource cost per graduate**

Actual costs per graduate are too complicated too compute and require cost studies to which we will probably not have access. A simpler measure is **graduates per teacher-year**.

The third tier concerns **equity indicators**. Establishing equity indicators essentially involves attempting to disaggregate the types of data already proposed for assessment of the overall primary school system. To keep from exponentially increasing the amount of work to be done, the number of equity indicators, and the number of axes of disaggregation, should be kept modest. We suggest three axes of disaggregation and four indicators for equity comparisons:

Axes of disaggregation

- Significant geographic or administrative regions
- Private/public education
- Gender (male/female)

Equity indicators

- Net enrollment ratio
- Cycle completion rate
- Textbooks/student
- Teacher training

C. Debate and Modification

Discussion of this overall model with IEES Project staff proved to be a highly instructive exercise and yielded a number of suggestions for improvement. Notable among these was the recommendation that at both the central and the country levels a distinction be made between an "ideal" version and a "feasible" version of the model.

The underlying idea is to identify and distinguish both a "best case" and a "likely" set of indicators. The first one gives all participants an occasion and an incentive to think about the kinds of information that they would really like to have in order to inform educational decisions bearing on system efficiency. It also gives us some protection against the danger of getting mired down in "least common denominator" approaches that lead to collection of an incoherent assemblage of data with borderline validity simply because it was (all that was) available.

The second approach (development of "feasible" indicator sets) provides a reality check against impractical or inappropriate model specifications born of too much concern with conceptual elegance or completeness and insufficient attention to what is currently possible in different country settings. We anticipate that iterative review of the ideal and feasible models will result in (a) an operational (feasible) model that is conceptually tighter, and (b) a better articulated optimal model that will be increasingly useful for purposes of training, policy discussion and educational planning.

IV. IMPLEMENTATION IN THE FIELD: PROCESSES ENVISAGED

A. Development of country-specific models

The next step foreseen in the process is to move the center of gravity in the development of the ideal and feasible indicators sets to three IEES participating countries. At present, there have been expressions of interest, but the final "self-selection" of these countries has not been made, nor has the exact process to be respected in-country been specified. This will doubtless vary from one location from another and be developed largely in situ, with the participation and support of IEES Resident Technical Assistants, where applicable. The minimal objective of the exercise will be to use the proposed system simply as **a tool for discussion and staff training**, and to enlist the help of host country counterparts in modifying and improving a model that the IEES Project will then use to track trends in educational system performance in the country.

If there is interest in participating countries, a good deal more can be done with the resulting system, or with the process of developing it. The exercise can serve as a basis for reviewing current uses of educational management information systems, designing means for interpreting their outputs, integrating qualitative information into the interpretation process, specifying types of local process research to be targeted for support, and/or training staff at different levels in the related analytic tasks.

B. Related Issues

Four major issues that merit exploration in tandem with this process are worth mentioning here. The first concerns the complementary roles of qualitative and quantitative outputs in educational decision-making, and the best means for ensuring a supply of relevant qualitative insight. Process data is the habitual weak point of indicator systems. We therefore envisage, as one component activity, a careful census of the qualitative and process studies currently underway in the countries in question (and potentially the encouragement of others through the IEES research agenda) in order to fill the gap and lay a firmer foundation for analysis.

A second and closely related issue concerns investigating actual patterns of use of data in educational agencies and pinpointing factors that determine their utility. The "sociology" and politics of data use is a topic as centrally important to EMIS operations as it is sensitive, and certainly merits thoughtful recognition.

A third important topic is related to the appropriate mix of nationwide and sample data in an indicator system. A number of more refined quantitative indicators -- as well as most types of qualitative information -- cannot be reliably collected for the whole country but can be very usefully approximated through focused sample studies. Developing this methodology as part of an EMIS merits closer attention.

A fourth critical subject concerns the relationship to be developed between national management information and indicator systems on the one hand, and regional or local ones on the other. Our experience clearly suggests that overly-centralized systems where field staff collect data solely to feed central files or computers end up receiving increasingly unreliable information. It is important to develop at the same time methods and procedures for synthesis and use of data **at local and regional levels**, not only as a support for better decision-making at this level, but also to help ensure that field staff see the use of the data collection effort and remain conscientious about it.

C. Analysis Strategy

Analysis is another congenital weak point of indicator systems, as participants in the current debate about educational indicators in this country have been quick to point out. Exactly how is one supposed to use the data gathered? Here lies one clear advantage of trying to articulate an underlying conceptual model, as we have begun to do above. That model can serve as an important aid in the analysis and interpretation of the indicator data.

Generally, we see two related directions for analysis: (1) examination of trends over time; and (2) diagnostic interpretation of system status data.

1. Examination of trends over time.

Part of the purpose of the indicator system is to provide a means of **tracking** the evolution of the educational system (most fundamentally vis-a-vis IEES activities) and spotting changes that provide early warning of serious problems or early evidence of major opportunities for school improvement. Consequently, a first level of analysis consists essentially of deducing direction and magnitude of changes in the key indicators from the longitudinal data assembled.

This is, of course, not quite as simple as it sounds, even assuming that enough sequential data on the same indicators are assembled to document a trend. One problem that typically confounds such an effort must be resolved before analysis can begin: The non-comparability of data on the same indicator at different points in time. It is quite conceivable that over time the indicator may be defined differently, the population on which the data were collected may be different and/or the reliability of the methods used may vary markedly. An initial effort to take account of these irregularities will need to be made.

2. Interpretation and diagnosis

In a sense, the analytical model pictured above already constitutes a framework for interpretation of the data and even diagnosis of the problems observed, since the network pictures a series of supposed causal linkages among educational system variables. If an anomaly or problem is observed at one level, we therefore have at least a suggestion of where to look for causes or contributing factors.

Of course, what constitutes an "anomaly" or "problem" for highlighting and investigation can only be determined with reference to the particular objectives and norms of the educational system under examination. This once again supposes the active participation and involvement of host country planners.

These remarks suggest the following order of action for interpretation of the data: First, determine trends. Second, isolate trends or persisting conditions that seem problematic, given the country's educational objectives (or, in their absence, accepted international norms.) Next, by comparative trend analysis, formulate questions and proposals about possible contributing conditions. Fourth, discuss the entire matter with host country researchers/planners and revise the analysis on this basis. Fifth, revise the indicator scheme and collection plan as warranted by the results of the analysis.

D. Dissemination Phase

The efforts described in this paper seem to us potentially to have some larger implications for data collection practices in education at the level of each country, as well as internationally. As much should be expected, since the IEES Project is in part an R&D endeavor with the explicit charge from AID of developing new procedures for educational planning and research that may be worthy of broader dissemination. If so, how should such dissemination be handled?

We think that the first critical dimension of the dissemination task lies **within** each host country. We will therefore be verifying in each case what are the existing in-country media for dissemination of educational research and reflection, and how we might collaborate with counterparts in using -- and simultaneously in strengthening -- these media. A second dimension evidently concerns exchange among participating countries and/or with educational personnel from potentially interested nations in the same region as the host country. A third and final dimension embraces international dissemination and publication within the United States.

In addition, we envisage publication at one or more of the above levels of a series of monographs to ensure broader availability of documentation on the development and products of this activity. Each monograph will represent a phase or particular theme of the project. Four distinct monographs and topics are presently anticipated:

(1) Overview monograph on conception, development and adoption of appropriate indicator systems for tracking educational efficiency;

(2) Survey and analysis of research now completed or presently being conducted in participating countries on educational **processes** and **quality dimensions**, the habitual weak areas in indicator systems;

(3) Monograph on problems of dovetailing national and local indicator systems and MIS's and on the staff and teacher training issues involved; and

(4) Monograph on questions of cross-national comparison of procedures and resulting data from efficiency indicators systems.

V. CONCLUSIONS

Several limitations of the analysis and processes presented in this monograph should be kept in mind. The first and foremost is that the schema presented is purely and simply a framework for thinking about indicator systems and so a potential starting point for the more important phases of related work that must go in the field. A second limitation is that the discussion is largely theoretical. In fact, much of what needs to be done in improving data utilization in the field is more particular and concrete and has to do with questions of how useful insights are drawn from existing data, how one diagnoses the small shifts in the type of information collected that could have major impacts on its usefulness, how disparate data collection systems in a single country or region are coordinated to eliminate waste effort and contradictions, and so forth. The framework suggested in this paper may nonetheless have some value for stimulating discussion and focusing attention on some "common denominator" issues in indicator system management.

In summary, one could say that "a funny thing happened on the way to establishing a project-wide indicator system for tracking efficiency trends": We remembered the importance of place and process and came up instead with a plan for engaging host-country participants in dialogue about -- and collaborative design of -- more flexible and location-specific systems.

That this should happen in the IEES Project is not surprising, for some of the Project's finest hours and best accomplishments have lain in the impulse to translate the current technique and jargon of educational planning into participatory exercises, accessible to host country counterparts and subject to their modification, criticism and influence. Sector assessment as practiced in the project, for instance, for all its sometimes heavy jargon, positivistic assumptions and economic bias, has been widely appreciated as a means of making the process of foreign aid allocation and educational policy analysis more visible and of opening the door to greater direction of the process by host country nationals (Easton, 1988). A number of project activities have had, intentionally or not, major institutional development consequences; and most have been characterized by a concern to adapt research agenda to capacity-building priorities. The reorientation of the efficiency trends activity is thus in a sense simply a move to make it more consistent with the spirit of the IEES Project.

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APPENDIX

DEFINITION OF MODEL DOMAINS WITH PROPOSED INDICATORS

I. CONTEXT

1. *Socio-Economic and Demographic Background*

This domain serves to establish the baseline context for assessing schooling inputs, processes, outputs, and outcomes. Five indicators have been selected to represent this domain: a) total population, b) life expectancy at birth,c) Purchasing Power Parity GDP per capita, d) newspaper circulation per 1000 population (to reflect literacy/communications), and e) the number of adults completing primary education.

II. INPUTS

2. *School Endowment*

The domain of school endowment is intended to reflect the basic physical and material resources available at the school site. The three indicators selected to reflect the availability of instructional resources are a) class to classroom ratio, b) whether furniture is provided, and c) the availability of instructional materials.

3. *Local/Community Support*

The degree to which local schooling is supported by the community is reflected by this domain. The indicators of this support are a) whether a functional PTA exists, b) the nature of school-community contacts, and c) the percentage of school expenditures met through non-central government sources.

4. *Central/Regional Support*

The support offered to local schooling through the central/regional offices of the Ministry of Education, or other institutional provider is represented by a) the number of textbooks produced, b) the number of school inspection visits by MOE officers, and c) the overall and non-personnel Government/MOE expenditures.

5. *Student Characteristics*

Student population characteristics, i.e., what they bring to the schooling enterprise, are represented by a) total enrollment, b) the percentage of female students, and c) data on their health and nutritional status. This domain of student characteristics is distinct from how students engage in the instructional process, which is represented below in "student participation."

6. *Teacher Characteristics*

The characteristics of the teacher population (status of the profession and what they bring to the instructional process) are represented by a) the number of teachers, b) the percentage of female teachers, c) training (by level), d) average salaries, and e) attrition rates.

III. PROCESS

7. *School Management*

School management refers primarily to the organization and provision of instructional time and resources, with additional indicators of administrator qualification and efficiency. To represent instructional time and resources, the following indicators have been selected: a) number of school days per year, b) hours of instruction per day, and c) school expenditures on facilities and maintenance. Indicators of administrator characteristics are d) the percentage of headmasters completing headmaster training, and e) a summary index of administrative efficiency.*

8. *Curriculum Quality*

The quality of the curriculum will be represented by summary indices of a) the degree to which the national curriculum is followed, and b) the appropriateness of the national curriculum.[1]

9. *Teacher Quality*

The quality of teaching is represented by a) the amount of teacher's time spent on instruction, b) the use of instructional materials for instruction, and c) the frequency of testing and feedback to students.

10. *Student Participation*

This domain refers to effective school attendance and participation in organized learning activities. The underlying variables concern quantitative and qualitative appreciation of "time on task" -- that is, time spent on the activities designed or intended to promote achievement of the school's learning outcomes. The indicators that we have chosen in this realm are a) student absenteeism rate and b) student time on-task.

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[1]Note: These "indicators" are a conceptual placemark, representing, to date, categories rather than actual indicators.

IV. OUTPUTS

11. *Student Attainment and Achievement*

This domain concerns the degree of achievement of primary school learning objectives in the cognitive and psychomotor realms and includes quantitative and qualitative assessments of those scholastic "outputs." The indicators that we have chosen in this area are a) percentage of students reaching the last grade of the cycle; b) results of mastery exams; and c) student grade-to-grade progression rates.

12. *Student Attitudes and Aspirations*

This domain concerns the degree of acquisition of selected attitudes, or the degree of achievement of specified affective learning outcomes, by primary school students. Chosen indicators are a) percent of students taking admissions exam for next cycle and b) the general area of student occupational choices (specific indicator yet to be designated).

V. OUTCOMES

13. *Later Academic Outcomes*

"Later academic outcomes" refers to the degree of success of primary school graduates in their further schooling, including admissions to higher level institutions of learning and completion of these subsequent cycles. The specific indicators chosen in this area are a) percent of graduates of the primary cycle entering the following cycle and b) the number of graduates in scientific/technical fields.

14. *Economic Outcomes*

The category "economic outcomes" refers to financial success in post-schooling employments and can include indicators like measures of the length of job search, stability of employment, and income of primary school completers or leavers. The specific indicators chosen are a) average earnings of graduates of cycle and b) labor force status of graduates of cycle.

15. *Social and Political Outcomes*

This domain covers other dimensions of social and political behavior that may be influenced by primary school attendance, including social mobility, political participation, number of children and their schooling, etc. The indicators chosen for this exercise are a) the general area of political participation of graduates of cycle (particular indicator yet to be designated) and b) an index (yet to be specified) of social mobility of graduates of cycle.

16. *(Feedback to Context)*

This category simply indicates that the outcomes of primary schooling have in turn an impact on the characteristics of the socio-economic context in which the school system operates.

2

The Role of Educational Management Information Systems and Indicators in the Operationalization of the Concept of Educational Efficiency: Eight Years of IEES Project Experience

Dwight R. Holmes

It is now nearly eight years since the IEES Project began in 1984—IEES being a ten-year initiative dedicated to assisting several developing nations to *Improve* the *Efficiency* of their *Educational Systems*. Note that you can see that what my colleague Peter Easton enjoys saying is true: "Efficiency is our middle name." Given that we are eight-tenths of the way there, it would seem incumbent on us at the project—and instructive for all of us in the field—to reflect back on the IEES experience, and to see where this pursuit of educational efficiency has brought us—to trace the evolution of the concept of "educational efficiency" and its companion concepts "Educational Management Information Systems" (EMIS) and "indicators," as they have developed and evolved within the project itself. This paper is a brief synopsis of my on-going research on this project experience, based primarily on IEES documents and reports.

For those not familiar with the project, I should point out that it has participated in EMIS, planning, and research activities in several countries, including Yemen, Somalia, Botswana, Nepal, Haiti and Indonesia, among others, and that the majority of the activities have been very country-specific, and not necessarily related to the work going on in other countries. More about the ramifications of this later on, but this is just to point out that it would generally seem more appropriate to speak of "IEES experiences" in the plural rather than the singular.

Efforts to improve the quality of education (following unprecedented growth in school enrollments worldwide) were coincident with new and stringent requirements to contain costs in the wake of the oil shocks of the 70's and recession/debt crisis of the early 80's. It was in this context that "efficiency" assumed its prominence as a goal and theme among donors and agencies involved in development education (Chapman & Windham, 1986). The mandate of this project was to assist countries to make more efficient use of the resources already available for education, instead of planning new, add-on programs which would require increased spending. Related to this approach were five issues, identified in the 1983 project proposal: 1) external efficiency (relevance); 2) internal efficiency; 3) access and equity; 4) administration and supervision; and 5) costs and financing (IEES, 1983).

Efficiency in education is discussed in the IEES I Proposal (and later in Windham's monograph and consistently throughout the project) in terms of external and internal efficiency. External efficiency refers to the relationship between school and work: How relevant is the product of the education system (its students and what they learn) to the world of work—and leisure—beyond school? The schools are approaching external efficiency to the extent that they

are preparing their students for life beyond their school-going years. Internal efficiency, on the other hand, is defined as a ratio of the inputs put into schooling—the available resources—to the output of schooling—the desired educational outcomes. Chapman & Windham, in their 1986 IEES monograph on "Evaluation of Efficiency in Educational Development Activities" point out that you can have both school *quality* and school *effectiveness* without necessarily being efficient in doing so. The process is, then, to identify the desired outputs, the goals of your education system (assume for the moment that you not only are able to articulate those goals, but to specify and measure them validly as well...); to the extent those goals are maximized, you have realized school effectiveness. You then compare those outputs to the inputs that went in, your costs. The resulting ratio is your measure of internal efficiency. And thus, as Windham writes, "efficiency subsumes effectiveness (Windham, 1988)."

The criticism is often heard that, in education, the pursuit of efficiency is done only at the peril of the pursuit of quality. Chapman & Windham state, however, undoubtedly in anticipation of this argument, that "efficiency is a criteria of instructional goal attainment, not an instructional goal in and of itself" (1986, p.4). The question is therefore not "Have we attained efficiency?" but "Have we achieved our educational goals, and done so as efficiently as we might have?" They pointed out that the instructional goals must be specified by all of the stakeholders involved—family, students, voters, policy- and decision-makers... And they criticize those who design oversimplified production functions which concentrate on some measure of academic achievement for ignoring the fact that education is a multi-input, multi-output activity. So that, for example, using test scores as *the* desired outcome and measure of school effectiveness ignores other competing and often contradictory goals such as distributional equity, and attitudinal and behavioral changes, to name two.

The logical extension of this would be, then, that ultimately each district, school, or teacher has to make their own decision about what goals to optimize and give priority to.

In what is perhaps the most debated position in the Windham monograph on "Indicators of Educational Effectiveness and Efficiency", it is stated that "the efficiency concept is a neutral device" (Windham, 1988, p.7). Taken out of context this may sound like a call to rally behind the cause of positivism and the objectivity of science. But Windham continues on to say that the success of the project in defining and measuring the inputs, processes, outputs and outcomes of the educational system will "determine whether the current attention focussed on efficiency is a positive or negative contribution to educational development" (Windham, 1988, p.7).

Thus we can say that if the efficiency criteria is controversial it is not for the reason that some would desire to waste educational resources; instead, it is because there are legitimate differences about what constitutes the nature of the teaching-learning process, and what the desired outcomes of the system should be (Chapman & Windham, 1986). The goals are contestable, and the measurement of the components is problematic. Since the IEES Project has been involved in data-based decision-making it has had to contend with both the contesting of goals and the problems of measurement. More about these aspects below.

The project's central concern is efficiency in education, and we have briefly reviewed how that has been defined at the theoretical level. Let us now move on to consider at how the project has tried to bring about these improvements.

At the heart of the IEES Project philosophy is the use of the Education & Human Resources Sector Assessment, a strategy which grew out of Florida State University's experience working with the Korean government to reform its education system in 1971 (Morgan, 1990). A sector assessment team consists of IEES experts and local educationists who work together for a period of six to eight weeks, to collect and analyze all available, relevant information and data about each aspect of the country's educational system—primary, secondary, tertiary, vocational/technical, adult and non-formal, and so on, in the context of the economic situation and taking into account the country's management capacity. The team attempts, through this process, to identify priority areas for investment in education, and to focus attention on the constraints which are present (IEES, 1985). Their recommendations are targeted to improve the utilization of financial and human resources within the education sector. The sector assessment philosophy is, then, to replace the "project approach" to planning (which had predominated earlier) with a comprehensive, "systems" orientation, in order to make more efficient use of available resources (IEES, 1985). The resulting document—the Sector Assessment—establishes the structural and institutional baseline of a country's education system, and points to a variety of EMIS, planning, research and project activities which the concerned Ministry may elect to incorporate into its workplan for the years ahead.

The goals of this Sector Assessment procedure are 1) to enable decision-makers in the Ministry to assess the status of educational development within the framework of national goals on an on-going basis; and 2) to aid them in targeting appropriate interventions which would bring about efficiency improvements in the system. This process also helps to accomplish the third goal of the project, which is to strengthen local capacity in educational planning and management (IEES, 1985).

The innovative aspect of this sector assessment approach was that it was to be "process oriented"—it would focus on putting in place continuous operations to measure "objectively verifiable education and training outcomes" (Florida State University, 1983, p. 36). It would not focus on any one structure (such as school buildings, teacher training, curriculum reform or instructional materials). Nor would it be guided by the idea that any one solution had universal validity (such as instructional technology or the use of media, literacy campaigns, textbook distribution, etc.). All of this derived from the observation that education is a multi-input—multi-output phenomenon (Florida State University, 1983).

As indicated above, it was intended that the sector assessment process would be an on-going one. Each Education & Human Resources Sector Assessment was designed to be updated as necessary, with increasing participation and direction by host country personnel over time (Florida State University, 1989). The long range objective was for the host country to gain the capability of conducting its own on-going assessment (IEES, 1985). Whereas the "Sector Assessment serves as the initial version of a continually updated resource to guide all activities

in the education sector" (IEES, 1985, p.16), the updates would be annual data-gathering activities which are topical in scope, not comprehensive. This structure would be the "long term vehicle for establishing and demonstrating the value of data-based planning, while creating opportunities for the development of host country capabilities" (IEES, 1985, p.16). And together these assessments and updates would form the core of the project data collection and analysis activities, which would in turn serve as the basis for efficiency improvements and for establishing policy dialogue based on data-based decision-making (IEES, 1985, p.15). This proposal to institutionalize the sector assessments approach as a regular activity has not been successfully carried out in any of the IEES countries. (Sector assessment updates were carried out in Botswana and Indonesia, but not in the annual, routinized manner foreseen in the project proposal.)

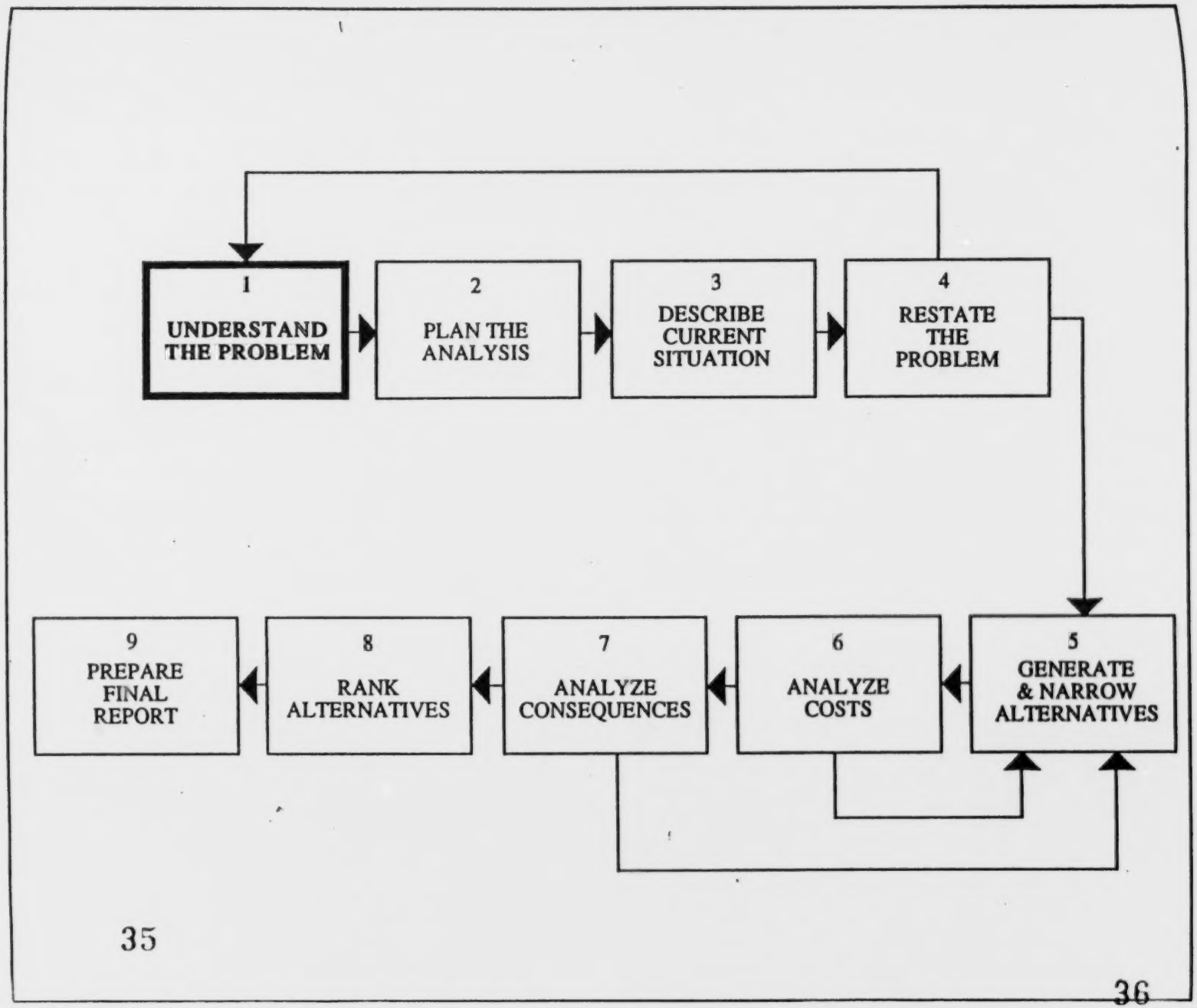
In addition to the proposal for annually carrying out sector assessment updates, an entirely separate strategy was being developed within the project as well, called Educational Policy Analysis Training. This activity was initially jointly sponsored by IEES and the World Bank, and was developed originally for use in Togo in 1986, in cooperation with a West African university consortium (Milton, 1986). The approach was to involve participants in the formulation of policy questions and alternative proposals with the use of case studies, which were designed using actual data collected in Botswana. Participants were given hands-on instruction in some statistical procedures, construction of data tables, and critical reading of the same. As part of the articulation of policy questions and responses, they were also given instruction in cost/benefit types of analysis.

This Educational Policy Analysis Training was in fact quite successful in its initial run in Togo. Materials were produced by the IEES team for both the participants and facilitators, which contained the case study materials and sequenced instruction, organized according to this flow model (see Figure 1).

The units were:

1. Understand the problem;
2. Plan the analysis;
3. Describe the current situation;
4. Restate the problem;
5. Generate alternatives & narrow them down;
6. Analyze costs;
7. Analyze the consequences of alternatives;
8. Rank alternatives;
9. Prepare the final report.

In analyzing the reasons for the success of this approach, and what its underlying philosophy was, it would seem it provided participants from the ministries with practical work in statistics—in contrast to what is offered in typical university courses in statistics—while also providing them with the opportunity to develop and practice skills in dealing with issues of data quality and other caveats. In addition, it gave them practice in interpreting data while utilizing


1
UNDERSTAND THE PROBLEM
2
PLAN THE ANALYSIS
3
DESCRIBE CURRENT SITUATION
4
RESTATE THE PROBLEM
5
GENERATE & NARROW ALTERNATIVES
6
ANALYZE COSTS
7
ANALYZE CONSEQUENCES
8
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9
PREPARE FINAL REPORT

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their own knowledge of the educational, social and political context in their countries. The use of real data proved to be very successful, as the West African participants were highly motivated in their discussion and analysis of policy alternatives (Milton, 1986).

The implicit philosophy of the training was this: For both the data technocrats, who believe that data is information, and the data disdainers who believe no data, this was a practicum in the fact that data is not information, but can, when used judiciously, provide a meaningful basis for decision-making.

An important question is, then, what happened to this training module, after it was tried and tested in Togo? It appeared to offer a methodology for developing local capacity for data-based analysis that was both relevant and could work. This should have, in turn, resulted in increased efficiency in the education sector. Why was this approach not pursued further? Several factors seem to have contributed to the fact that this package has remained essentially "on the shelf"—factors both exogenous and indogenous to the project.

In fact, it was planned to use the Educational Policy Analysis Training materials for a training in Haiti, and arrangements had been made for this in the summer of 1987. Unfortunately, the day of the first session the streets of Port-au-Prince were filled with gunfire, no one from the ministry showed up, and the IEES team which was there to conduct the workshop had to leave by the next plane out. The workshop was never rescheduled, as that was the last IEES activity with the ministry in Haiti. (Most IEES work in Haiti has been with non-government schools.) Additionally, the World Bank decided against continuing in its role with the activity, which is the reason why the planned second running of the workshop in Togo never took place.

More essential, however, is the fact that although IEES is a centrally-funded project (meaning that it funding and direction come out of USAID/Washington and not from the USAID missions in cooperating countries), the activities are largely independent country to country, and, for the most part, decisions are made between the local AID mission, the concerned Ministry, and the IEES country coordinator in Tallahassee. Only those activities falling within a particular country's Country Plan, are implemented. There is, for the most part, no central direction in the development of these plans. While some would argue that this is by design and concurs with IEES' overall decentralization posture, others might say that the project lacks needed conceptual direction. And furthermore, that it suffers from bureaucratic amnesia. The Togo materials are quite likely not the only ones sitting on the shelf in Tallahassee which might be of good use in one of the project countries.

Of course, the fact that the Togo package of materials has not been specifically incorporated into workshops elsewhere does not necessarily imply that training in policy analysis has not been conducted under IEES. In fact, much of this same kind of work—training in policy analysis—has been going on continuously on a day-to-day basis, with the project advisors and their various counterparts and colleagues. And this may ultimately be as effective a means of imparting that type of training as any. Being less formal, it tends to remain less documented as well.

The first few years of EMIS work had been spent introducing computer hardware and software, revising school report forms along the lines recommended in Sector Assessments, and developing the ministries' in house capacity to collect and report statistics in a timely manner. All of which were precursors to being able to do any real policy analysis, on the one hand, or to inform the planning process, on the other. As this EMIS work progressed along, there were advisors and consultants working in close collaboration with education ministry personnel in their efforts to improve the usefulness of the data being collected; and this created the need to operationalize—in very specific and practical terms—such concepts as educational quality, equity, and efficiency. Project personnel were forced to move from the more theoretical formulations of early documents on efficiency indicators to the nitty-gritty of constructing composite indicators from available data. This enabled the focus of the EMIS systems to progress from data production, the focus of the first five years of the project, to policy formulation, the focus of the second phase (Florida State University, 1989).

Much of this work was carried out in Indonesia by Jim Cobbe, an economist. His tasks were to construct, in conjunction with his counterparts, a system of educational indicators to be used in policy analysis and educational planning at the national and provincial levels, and to collaborate in identifying and developing a series of indicators of educational quality, equity and efficiency which would serve as a basis for a resource allocation model for financing the education sector. The fact that the Ministry of Education & Culture made efforts to requested assistance in carrying out this specific task signified that the ministry had realized it would benefit from having indicators of quality, equity and efficiency available to use in its lobbying efforts with the Ministry of Finance during the annual budget negotiations.

Cobbe pointed out that efficiency measures, in the present Indonesian context, are necessarily indirect, since there exists neither a baseline of entry-level standards and achievement data nor any definition of the education system's concrete objectives (Cobbe, 1990). Given that, what you are left with, he says, is the assumption that quality is somehow constant, and therefore that if the ratio of inputs to outputs goes down, there has been an increase in efficiency. Somewhat contradictorily, you are also left with the assumption that if the ratio of inputs to outputs goes up, there must have been an increase in effectiveness. It is because of this paucity of data and agreed-on objectives that efficiency indicators appear to be the inverse of some quality indicators (Cobbe, 1990). He then goes on at great length to caution us that interpretation of indicators must be done by analysts who know what they are doing and why, and who are very familiar with the sources and nature of the data which they are analyzing; indicators are, at best, imperfect and indirect, and can be greatly misleading.

The immediate output of this activity was a manual on the production of analytic educational indicators, showing which statistics are available where, and how to calculate useful indicators from them. It also lists various caveats about the weaknesses of the same.

At a more analytical level, and growing out of deliberations among IEES core staff members, the need for a framework of indicators was realized. Ensuing work led to the development of an indicators model, which was intended to provide the framework for an indicators system

within an EMIS. The initial phase of this activity, carried out as a home office activity, is outlined in the report entitled "Collaborative Design of Educational Indicator Systems in Developing Countries" by Easton et al., which is included in this volume. Adaptation and implementation of the model is presently being carried out in two IEES countries, Nepal and Botswana. The chapters by Williams and Burchfield report on those activities. The development of the model itself is briefly described in the following pages.

First, a literature review on the theoretical aspects of indicators and indicator systems was carried out, followed by the compilation of an inventory of indicators reported or discussed in a variety of U.S. and international sources, including IEES project materials such as sector assessments and the Windham monograph. Altogether over 600 indicators were listed, which were as specific as "the per student per cycle cost of primary education" and as broad or vague as "teacher quality" and "articulation of the curriculum." Some were ambiguous, such as "student participation." These indicators were then sorted into categories which were eventually labeled "domains" and placed into the model (Figure 2) which drew on earlier work by Odden, and the IIBE Project in Haiti (Odden, 1990; Easton et al., 1990).

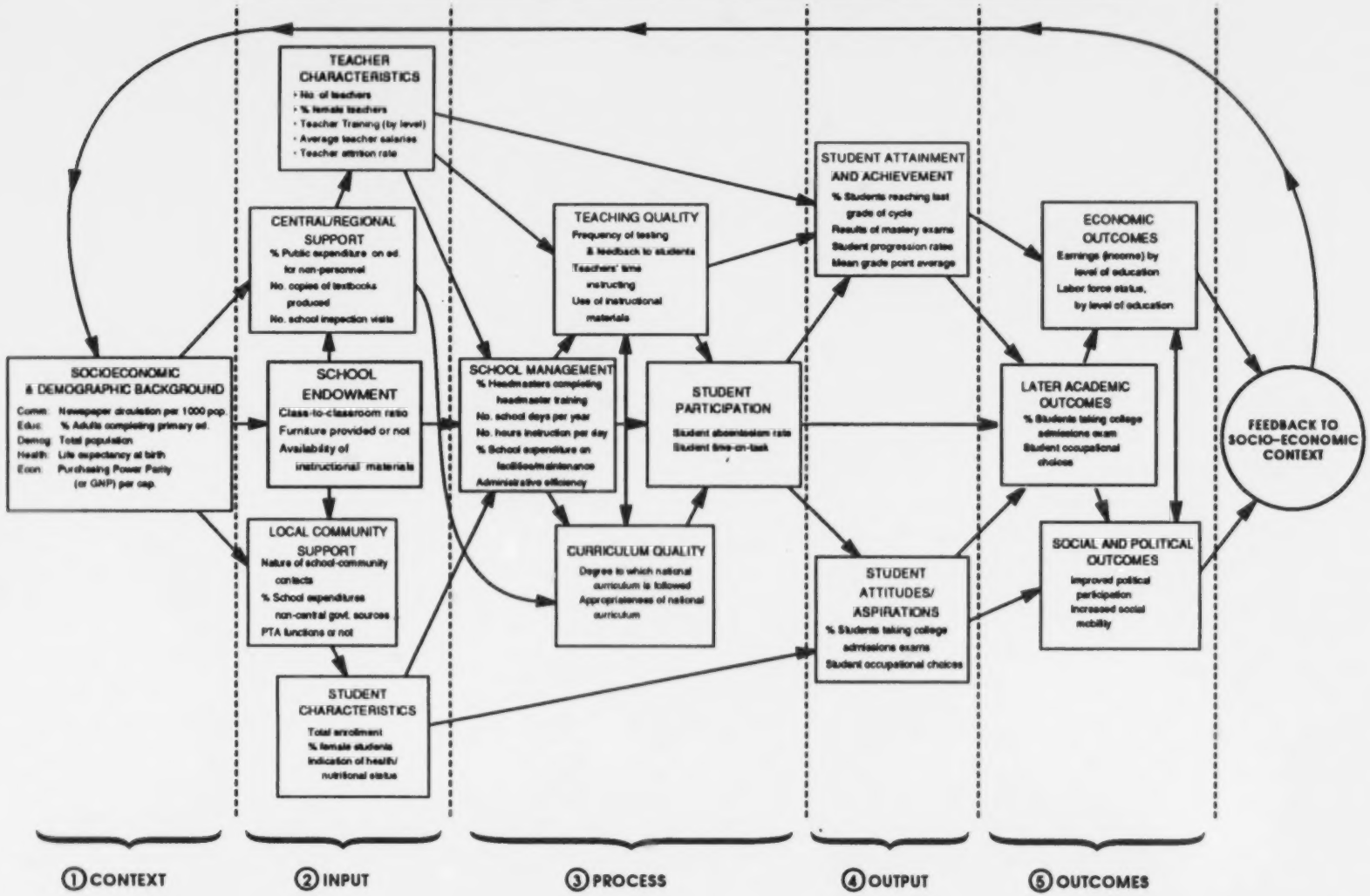
The final and most significant step is underway at present: The adaptation of this model by participating ministries in Nepal and Botswana. There are several reasons why indicator systems should be locally generated (Easton et al., 1990) including the fact that data availability varies greatly across countries; perhaps the most important reason is that highlighted by Windham earlier: Efficiency has little meaning until operationalized by the specification of objectives, which must be country specific. But note that shifting the process to host countries does not make the question "Whose goals? and who decides?" any less relevant.

The IEES efforts to operationalize the efficiency concept led to a focus on indicators; and the need to maintain the systems approach and to provide a frame of reference for choosing and analyzing indicators led to the development of this model.

The underlying conceptual model consists of three tiers: descriptive indicators, efficiency indicators, and equity indicators. At the descriptive level (see Figure 2) the characteristics of the educational subsystem in question are organized into fifteen domains (e.g., teacher characteristics, student participation, etc.) which are, in turn, grouped within the aspects of *context*, *inputs*, *processes*, *outputs* and *outcomes* of education. While some of the suggested indicators are purely descriptive (e.g., number of school inspection visits), others are in fact ratios and thus are themselves implicit efficiency measures (e.g., percentage of students reaching last grade of cycle)—which is to say that the model is neither fully developed nor consistent. At the second tier of efficiency indicators, some efficiency indicators were specifically proposed, such as "resource cost per graduate."

The third tier concerns equity indicators. Establishing equity indicators essentially involves the disaggregation of the data already proposed for use in assessing the overall school system. In an effort to keep the size and complexity of the system manageable, it is proposed that the number of equity indicators, and the number of axes of disaggregation, should be kept modest.

TENTATIVE EDUCATIONAL SYSTEMS MODEL



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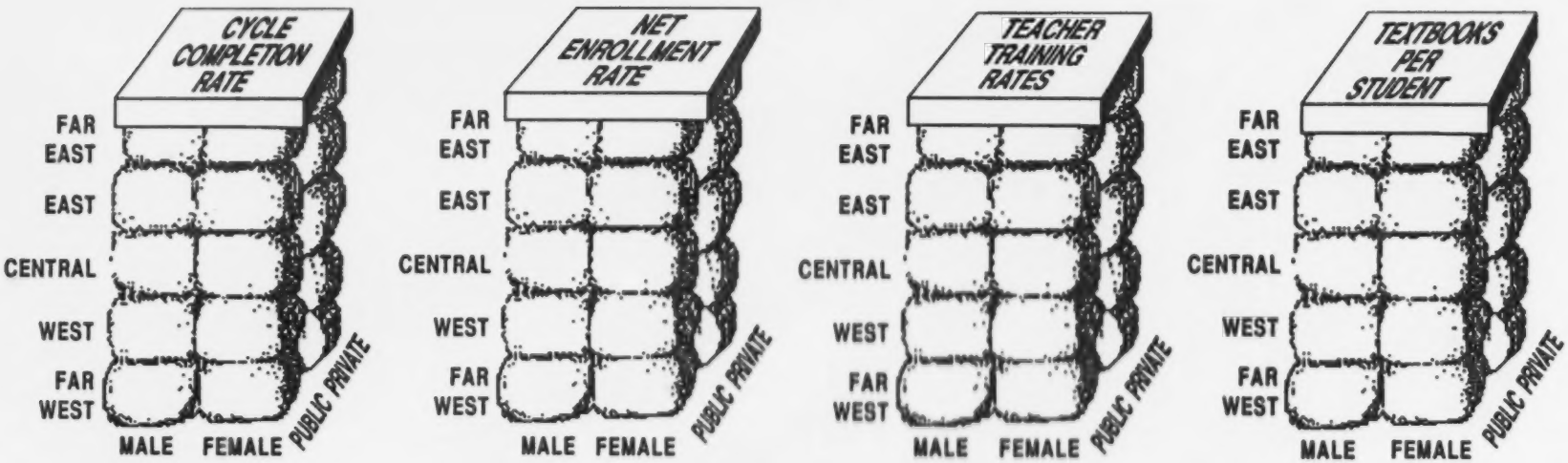
EQUITY INDICATORS



(for Primary Education Sector)

Easton et al. have suggested three axes of disaggregation and four indicators for equity comparisons (also see Figure 3):

Axes of disaggregation

- Significant geographic or administrative regions
- Private/public education
- Gender (male/female)

Equity indicators

- Net enrollment ratio
- Cycle completion rate
- Textbooks per student
- Teacher training

Above all, it is emphasized that indicators do not explain anything; they only point (Bottani, 1990). All importance must be given to the interpretation of the indicators, so that we know what is being pointed to.

The intent behind the development of this model was to establish a frame of reference for selecting appropriate indicators, and a process which might enable the development of durable EMIS indicator systems in different countries.

The model then serves two functions: It is a template which can assist planners in sifting through vast amounts of data to select and prioritize a manageable number—and representative range—of indicators to monitor; it also provides a structure of plausible comparability across countries (whereas the specific data may not themselves be comparable, the framework of analysis is). The model enables countries to select indicators of efficiency in aspects of the system consistent with the direction of national goals and priorities while still keeping the whole system within view. This model is being utilized in Nepal and Botswana—these experiences are reported in other chapters in this volume. The utility of these efforts to measure "educational efficiency" for the purpose of providing feedback on the performance of the education system and informing policy debate will need to continue to be assessed beyond the life of the IEES Project.

CONCLUSION

Under the aegis of EMIS, research, and indicators activities, a variety of strategies have been utilized to build the infrastructure and human capacity in participating ministries for data-based decision-making. Computer hardware and software was brought on, and training provided to appropriate personnel; school statistics forms were revised, and collection processes streamlined. In some countries, research was carried out on the subject of how officials regarded and used the data that are available, and how reliable the data are. Modules were developed and tried for

training ministry officials in utilizing data for policy analysis—though that particular has not been used again. Nevertheless, other trainings have been given to those in planning and management, and considerable on-the-job training was gained by those who have worked with IEES resident technical advisors. Recognizing the need to specify and quantify educational inputs, processes and outputs, the Windham indicators monograph was produced, and considerable work was done in Indonesia, in particular, but also Haiti and Botswana, in defining sets of indicators that would be both practical to produce and meaningful to interpret. This was followed by development of the indicator systems model by Easton et al., which is designed to serve as an aid in both setting up EMIS/indicator systems, and in formulating policy questions focussing on issues of efficiency and equity.

Though perhaps none of the countries is now in the situation of having ready-made "efficiency report" schemes in place, one can see considerable movement from the crude to the subtle if one compares the early work in building up the statistics collection capabilities with the current work underway in several countries.

One could argue, of course, that the experience of the project has been one more focused on rationalizing educational planning and policy-making than on directly impacting the efficiency of the educational systems. The actual sphere of influence of the project may in fact be at the level of working towards more "efficient" decision-making within the structure of the Ministry, and is still several levels removed from directly influencing the more efficient allocation of resources, let alone the efficiency of operations in the school. Perhaps Windham's warning was well-placed: The unresolvable problems of articulating a set of goals for the system which all or even most can agree on, coupled with the technical problems of how to explicate, operationalize and measure inputs, processes and outputs of the system may render useless the efficiency concept so far as educational policy analysis goes.

Definitely, data and data-based analysis have begun to more frequently inform the decision-making processes in some IEES countries. But are the Ministries of Education making decisions now that lead to greater efficiency in the school system than was previously the case? Certainly there are some specific examples which can and have been cited. But systematically, is this the case? The evidence for this has not been documented. Given the continuing flux in economic, demographic and political situations it would be surprising if it had been.

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3

PLANNING AND IMPLEMENTING EDUCATIONAL MANAGEMENT INFORMATION SYSTEMS: THE CASE OF BOTSWANA

Shirley A. Burchfield

BACKGROUND

OVERVIEW OF THE EDUCATIONAL SYSTEM

Situated in Southern Africa, Botswana is about the size of Texas (582,000 square kilometers), with a population of 1.3 million in 1991 and a Gross Domestic Product of U.S. $2.4 billion. Per capita income is U.S. $1,050. The primary school net enrollment ratio is 92%, and the proportion of Standard 7 primary students who go on to junior secondary school is 81%. The structure of the educational system is currently 7 years of primary, 2 years of junior secondary and 3 years of senior secondary education. The Ministry of Education is responsible for the administration of the educational system. It sets and marks Primary Leaving School Leaving Exam and the Junior Certificate Exam, as well as recruits and deploys the teaching staff in primary and secondary education.

In order to carry out its management responsibilities, the Ministry maintains Departments of Primary Education, Secondary Education, Teacher Education, Technical and Vocational Education, Non-formal Education and Curriculum Development and Evaluation. Each department is supervised by a Chief Education Officer; the Planning Unit is headed by a Principal Planning Officer, and all Planning Unit staff are employees of the Ministry of Finance and Development Planning; the Unified Teaching Service is headed by a Director and the Bursaries Unit by a Secretary. The Brigades, an organization that provides technical training for junior-secondary school leavers and drop-outs relates directly to the Permanent Secretary. The University of Botswana is an autonomous institution, controlled by a Council but maintained by public funds from the Ministry of Education. Students receive government bursaries to attend the university and are then are bonded for a limited period after graduation to work in the public sector.

The day-to-to day management of primary schools is undertaken by District and Town Councils under the overall direction of the Ministry of Local Government and Lands. Since the abolishment of secondary school fees in 1988, all public education in Botswana is free. Secondary schools are divided into three categories: government, mission-aided and community schools. Community schools are controlled by local Boards of Governors. The Ministry has a policy assuring access for disabled or handicapped students, and a special unit within the MOE is set up to liaise with other agencies that provide assistance to handicapped students.

EDUCATIONAL POLICY AND PLANNING

Botswana educational policy is mainly determined through National Development Plans which are prepared and implemented in six year periods. The Seventh National Development Plan began in April 1991. The Ministry of Education (MOE) is the government organization responsible for determining, coordinating and implementing educational policy. Serving as the blueprint for Government of Botswana policies, the National Development Plan preparation process involves an extensive cycle of development, review and revision. These policies are developed and implemented through the Ministry of Education's Policy Advisory Committee (PAC), whose membership consists of heads of departments and units of the Ministry. The committee is chaired by the Minister and, in his absence, by the Permanent Secretary. If decisions made at this forum are of a serious nature (particularly if they have financial implications), they go to Cabinet for approval. This committee meets at least four times a year. Any head of department wishing to bring a policy issue to the PAC for consideration must prepare a paper on the issue, outlining problems and providing policy proposals. The paper is circulated to other members, and issues are discussed at a PAC meeting. Some decisions, such as housing policy for teachers, membership of school boards and transfers of teachers are referred to Cabinet.

INFORMATION FOR DECISION-MAKING

The Botswana Ministry of Education has long understood the importance of accurate and timely information for decision making. Since independence, the Central Statistics Office (CSO) of the Ministry of Finance and Development Planning (MFDP) has produced an annual ***Educational Statistics*** publication, which contains data on schools, teachers and students. This information is widely used for MOE planning and programming decisions. However, as the educational system in Botswana expanded, the time required to collect and analyze data also increased. The CSO publication is usually released about two years after the completion of the school year, limiting its usefulness for many planning purposes. In addition, many of the departments need much more detailed information than can be provided by the CSO. Consequently, several of the departments within the Ministry of Education have begun to carry out their own data collection.

During the past few years, the Improving the Efficiency of Educational Systems (IEES) Project has assisted several MOE departments in establishing computer databases, including: the Planning Unit, Unified Teaching Service (UTS), Department of Primary Education, Department of Secondary Education, Department of Non-formal Education, and Department of Bursaries. With the rapid expansion of information systems, the MOE has had problems with both duplication of effort and inconsistencies among data sources, due in part, to variations in the data needs of individual departments and the collection of data over different periods of time. For example, both the Primary Department and the Unified Teaching Service collect information about teachers. While the UTS only tracks teachers on the UTS payroll, the Primary

Department collects data on students and teachers in all registered primary schools, including mission and private schools. This information is needed to calculate the number of eligible school-age children enrolled, as well as those who will need to be accommodated in junior secondary schools. As a result of these differing requirements, two estimates of the teacher population exist. This is not a problem as long as the parameters of the two sets of data are clearly stated. However, in the past, confusion has occurred when different figures were quoted in various reports and speeches.

As the number of databases grew, the need for information coordination became more evident. Consequently, a Database Managers Group was established to exchange information, discuss issues related to the development of individual databases and to establish common procedures for use by all MOE departments/units regarding coding, selection of software, and dissemination of information. Meeting once a month, this group has operated effectively for almost five years. Membership consists of individuals who are responsible for developing and maintaining databases in each MOE department, as well representatives from the Central Statistics Office and the University of Botswana.

While establishment of the Database Managers Group helped address many data problems, it soon became clear that a central source of information comprised from the various databases was also needed. Several alternative approaches to developing an Educational Management Information System (EMIS) were considered. It was decided that efficiency analysis would be the most useful approach. Efficiency analysis, according to Windham (1988), is a framework for decision-making that assumes scarcity of resources and the need for difficult choices. There are several reasons for selecting an approach based on efficiency analysis. Botswana is in the process of implementing policy reforms that will have far-reaching impact on the educational system. The Government has set a goal of achieving universal access to basic education, an aim which requires a major expansion program at the junior secondary level. At the same time the Government is also committed to improving the quality of education.

Careful planning ensured sufficient resources for achieving the objectives for the initial expansion period. The number of private and community junior secondary schools (CJSSs) grew from 42 in 1985 to 146 in 1992, and the percentage of primary students admitted to junior secondary school increased from 36% to 81%. However, this expansion has proved to be more costly than originally anticipated, and there is concern about the cost of sustaining this rate of increase. Furthermore, a possible decline in the growth in Botswana's economy could eventually diminish the resources available to the education sector. The interest in quality improvement and cost containment have resulted in a need to seek ways of managing system growth and quality improvement in a cost-effective way. At the same time it has become necessary to begin monitoring how well the changes address specific policy objectives. Educational systems need to be efficient both in generating and in expending resources, and these two objectives are not always perfectly compatible.

An Educational Management Information System specifically designed to facilitate efficiency analysis is an important first step toward meeting these needs. The elements of the EMIS

described here provide the framework to analyze efficiency. This system will also assist in determining the extent to which the Ministry is accomplishing the objectives outlined in the National Development Plan and help to coordinate information from the various Departments within the MOE.

A FRAMEWORK FOR TRACKING AND ANALYZING EDUCATIONAL EFFICIENCY

With this in mind, a framework for tracking and analyzing trends related to educational efficiency in Botswana was developed. In order to establish this framework, seven basic steps (outlined by Easton, Holmes and Williams, 1990) were followed:

1. Development of conceptual definitions for principal terms and concepts to be used;
2. Articulation of the underlying model relating the indicators to each other;
3. Selection of indicators;
4. Data collection;
5. Data analysis;
6. Consideration of other technical and methodological methods;
7. Consideration of other organizational and instructional issues.

CONCEPTUAL DEFINITIONS

In developing the Botswana EMIS model four key terms: ***indicator, educational efficiency, educational quality, and equity*** were defined. There are many definitions of these terms. The boxes which follow depict but a few of these.

INDICATOR

"An indicator is a statistic about the educational system that reveals something about its performance or health." (Oakes, 1986)

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"It either assesses or is related to a desired outcome of the educational system or describes a core feature of that system." (Smith, 1988)

"Indicators...should permit immediate--or nearly immediate--inferences about the performance of the [educational] system." (Cobbe, 1989)

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They "provide measures of various components of the educational system, as well as information about how these components work together to provide the condition of the system and changes in the condition of the system over time." (Odden, 1990)

"Indicators are proxies used to represent the underlying reality of the system or program...and are necessarily an over-simplification of this reality." (Chapman, 1990)

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"Indicators do not explain, they only point." (Bottani, 1990)

EDUCATIONAL EFFICIENCY

The concept of efficiency provides a broad perspective from which to analyze an educational system; one in which the costs of educational inputs and processes can be related to benefits, such as improved effectiveness. As noted by Easton, et. al. (1990:11), this concept has meaning only if outputs and outcomes are correctly specified and measured. However, outputs and outcomes may vary significantly from one country or region to another. These authors also point out that "they may involve affective, as well as cognitive results, group, as well as individual effects, and distributional, as well as summational considerations."

In general terms, "efficiency refers to the state of being productive, capable, and competent. But in the technical sense, it refers to the relationship between cost and effectiveness." (Hartwell, 1989)

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"[Efficiency] refers to the endeavor to get the most output from given quantities of inputs. Thus, measures of efficiency ideally are quantitative ratios of output to input in some form." (Cobbe, 1990)

"Efficiency is a ratio, not an absolute magnitude. (Easton, et. al., 1990)

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"...<u>internal</u> educational efficiency...exists where the value of educational output is maximized for a given cost of inputs (or where cost is minimized for a specified value of output)." <u>External</u> efficiency refers the relationship between the educational system and the external environment (i.e., the world of work and leisure). Chapman and Windham, 1986)

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According to Snyder and Nagel, (1988:14), quality of education is probably more related to the content and process of education than to the extent of schooling. They maintain that indicators of quality and efficiency "must be multifaceted and probably highly inferential in order to capture the richness and complexity of schooling."

EDUCATIONAL QUALITY

"On the one hand, quality is defined as the embodiment or approximation of characteristics that are socially accepted as proof of excellence. Thus, if all teachers in an academic secondary school have Master's degrees, the group will be considered a high quality staff. On the other hand, quality is defined as the proven ability to produce results..." (Easton, 1989)

"Quality is a personal evaluation. Although it may be influenced by physical conditions and circumstances, quality entails feelings, attitudes and values, and it is more than the sum of objective indicators." (Snyder, 1990)

EQUITY

"By equity in education, we mean fairness between distinguishable groups in terms of access to, participation in, and achievement of the educational system." (Cobbe, 1990)

Cobbe (1990) contends that to measure equity, we must have data that distinguish between the groups among which we wish to ensure equitable distribution of resources or services. Possible characteristics for analysis include gender, geographic location and private/public education. Examples of indicators of equity are statistics such as net enrollment ratios, cycle completion, number of textbooks available to students and the extent of teacher training.

ARTICULATION OF THE UNDERLYING MODEL

The model selected as the basis for the EMIS in Botswana is a variation of the Context, Input, Process, Product (CIPP) Model, which has been widely used by educational evaluators since the 1970's. This model classifies educational information into the categories identified by Stufflebeam as ***Context, Input, Process*** and ***Product***. Windham's (1988) discussion of educational efficiency uses a similar taxonomy but classifies information into categories of: **Inputs, Process, Output** and ***Outcomes***. The Botswana model incorporates components of both models to include the categories described below.

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Context. Context information describes the current conditions, issues, opportunities and constraints in the environment. It is a form of needs assessment which assists in identifying the types of programs appropriate to a given setting.

Inputs. Inputs are the resources available for educational production. Inputs include characteristics of students, schools, teachers and instructional materials. In examining inputs it is necessary to analyze recurrent unit costs and development costs.

Process. The process stage of educational production refers to the means or processes by which educational inputs are transformed into educational outputs. According to Hartwell (1989:4), "Processes are what happens to inputs within the school setting (or non-formal) setting and involves management, leadership, the acts of teaching, the process of learning, inspection, school activities, supervision of teachers, and the operations of the Ministry of Education in organizing and utilizing its resources and finances." A specific process for promoting educational outputs is sometimes referred to as an ***educational technology.***

Outputs. The direct and immediate effects of the educational process are the outputs. They include cognitive achievement, manual skill development, attitudinal changes, and behavioral changes. Outputs can be divided into two categories: educational attainment and educational achievement. The former is quantitative and includes the number of students attain a given level of education over a given period of time. The later reflects social values, policies and educational aims. It includes values, attitudes, competencies and knowledge that students achieve as a result of their educational experience. To assess educational effectiveness, we should know not only what students achieved in relation to curriculum objectives, but how the school and educational experience assisted them to gain knowledge, skills and competencies.

Outcomes. Educational outcomes are the less direct and less immediate results provided through the interaction of educational outputs with the social environment. Outcomes cover a wider range of individuals than just the leavers of the educational system, a longer time period, and a larger political-geographical reference area. Indicators of outcomes are the levels and nature of productive work and employment of school leavers and graduates and their wages or income. Outcomes also include the contribution of educated individuals within a family and community.

SELECTION OF INDICATORS

A preliminary set of indicators of educational efficiency in Botswana was compiled with assistance from the IEES Resident Technical Adviser (RTA) and Florida State University staff. The Botswana Data Managers Group and the IEES RTA then participated in a series of working sessions to identify items that are currently available, as well as those that are needed but are not being provided by any of the departments.

It was decided by the Data Managers Group that the initial database should only include information currently available, rather than data requiring additional research. Furthermore,

in order for the database to be sustainable over time, it was concluded that it should be manageable in size. If first efforts are too ambitious, participants are likely to be overwhelmed by the enormity of the task of collecting and maintaining the data. The objective is not to duplicate databases being maintained in other departments but rather to select key summary information needed for central decisions. The system is designed to cross-reference other databases and recent research so that managers can quickly discern where to go for detailed information. Based on these criteria, a set of indicators was selected for inclusion in the system, as well as those which should be added at a later date.

Tim Goddard, a former Peace Corps Volunteer who helped to set up the Primary Department database, was hired as a consultant to write the programs for a menu-driven EMIS. A set of data entry forms was then disseminated to each member of the Database Managers Group and meetings were held with individuals to clarify data items and ensure consistency in reporting. The database was organized into categories (by department), as shown in Figure 1. This diagram is a modified version of a flow-chart compiled by Easton, et. al. (1990). Changes to the original model were based on the Database Managers Group's assessment of what information is both necessary for planning and decision-making and realistically attainable. The boxes with broken lines represent categories of information that are not currently available but should be added at a later date. Acomplete list of data items, by category, is presented in Appendix A. You will note that the majority of information falls into the ***Input***, ***Process***, or ***Output*** category. Some *Context* information, such as per capita incomes, average life expectancy, and other socio-economic indicators will be added at a later time. Information on ***Outcomes*** is much more difficult to obtain and will require additional research.

Appendix B depicts the EMIS Main Menu and the first set of screens associated with Primary Department information. Similar screens appear for each of the departments listed on the Main Menu. Altogether, there are over 100 screens which can also be printed. As previously noted, the EMIS in Botswana is designed so that data sets can be expanded as more information becomes available. Some data items that were considered to be important but which were not currently available were built into the system.

DATA COLLECTION AND ANALYSIS

Data collection for the first year was carried out over a seven month period from August to February, 1992. This process took much longer than originally anticipated, largely because of competing demands on Ministry of Education staff's time. In almost all MOE departments, maintaining databases represents only one of many duties of the data manager. Also, data managers' estimates of what data could be readily obtained were overly optimistic. Much of the information was either unavailable or widely scattered. For example, information from the newly formed Teacher Education Department took six months to collect and required that the representative to the Data Manager's Group travel to teacher training institutions and education centers in various locations around the country. This had to be accomplished while he was juggling many other activities, such as developing materials and conducting teacher training workshops. However, he felt that this was an extremely useful exercise that helped him to

A FRAMEWORK FOR TRACKING AND ANALYZING TRENDS RELATED TO EDUCATIONAL EFFICIENCY IN BOTSWANA

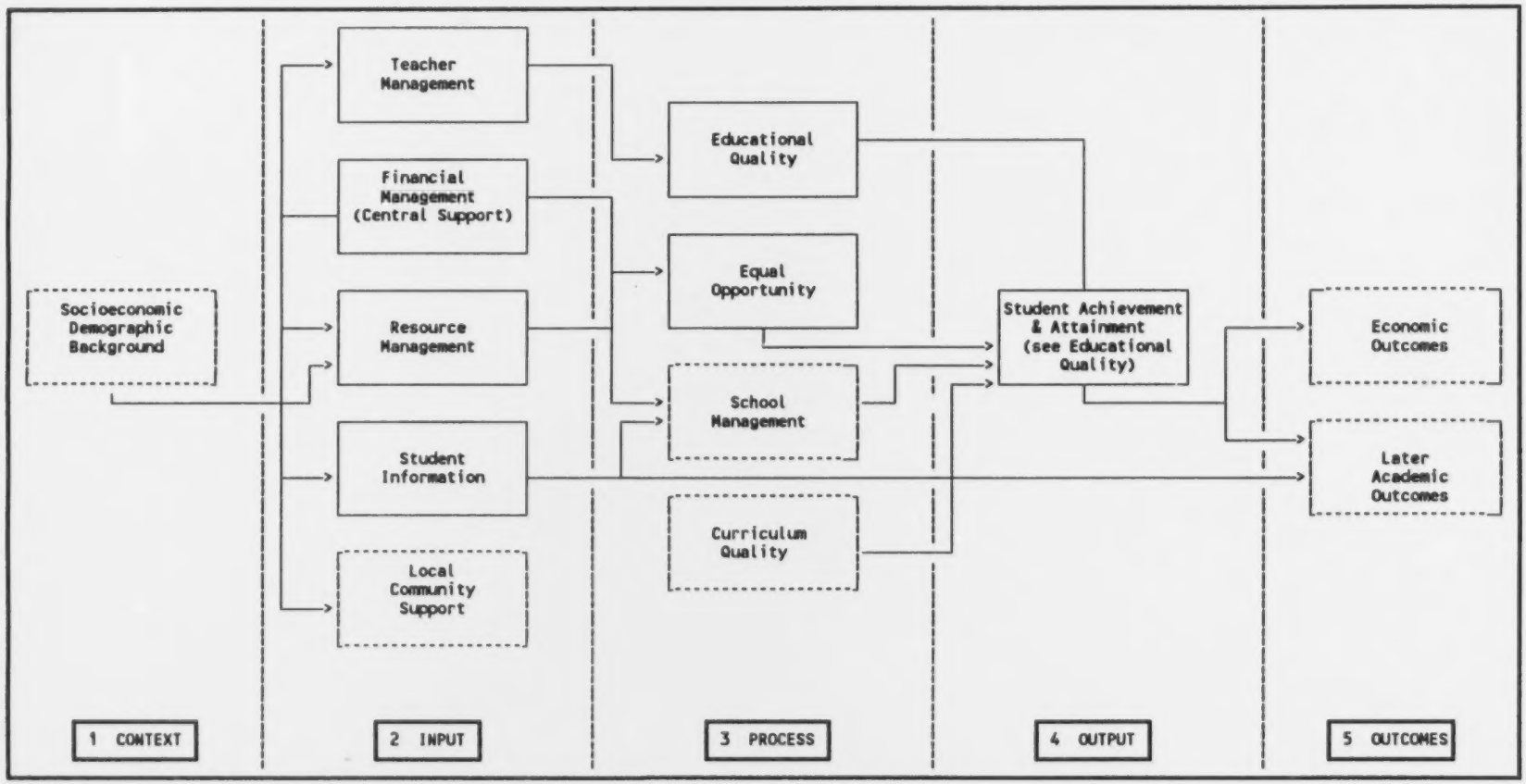

Figure 1

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formulate databases for the department's own use. Now that the teacher training college principals and the education center directors are aware that they will be expected to provide this information on an annual basis, data collection should flow much more smoothly. Data managers in other departments have reported similar experiences.

TECHNICAL AND METHODOLOGICAL ISSUES

Consistency in Time Period Covered

In order to allow comparisons, it is important that the time covered in the statistics provided by all departments be consistent. Although efforts were made to ensure that all information covered the same time period, this was not always possible for two reasons. First, the length of time it took for each department to collect the data ranged from one to seven months. Even though the time frame for which the data were to cover was explicitly stated, several departments provided the most up to date figures available, rather than figures from the specified time frame. Second, there is considerable variation in the timing of school calendars at different levels in the educational system in Botswana. Primary, junior and senior secondary schools and the teacher training colleges operate on a trimester system, with classes running from January to April, from May to August, and from September to December. The university and the vocational training centers operate on a two-semester system, with the first semester beginning in August and ending in December and the second semester operating from January to April. These differing calendars make it extremely difficult to adhere to a consistent time frame in all the databases.

Equity Issues

One of the objectives of the EMIS in Botswana is to collect information relating to equity issues. Although it was possible to disagregate some information into gender and district-level analyses, additional information is still needed if the EMIS system is to be effective in assessing educational efficiency.

National vs. School-Level Data

Snyder and Nagel (1988) maintain that one of the major short-comings of most management information systems is the emphasis on indicators of educational expansion (e.g., number of secondary school graduates, percent of school-aged population enrolled in school) at the national-level at the expense of school-level data. Although such information allows comparisons to be made among cases and over time, thus allowing time-series analysis or inter-country comparisons, it does necessarily indicate a more educated population. They argue that quality cannot be measured in terms of quantity (or expansion); more is not necessarily better. National-level measures of achievement (such as number of schools, teachers, and

literacy rates) also permit comparisons across cases and time but share the same validity problems as measures of educational expansion. National-level data indicate the extent of schooling but are not helpful in assessing the content or process of schooling. For example, information about the number of textbooks available or the existence of a national curriculum does not tell us how many teachers are actually using the curriculum nor the methods they are employing to teach the materials. Hence, these authors believe that the most useful unit for the focus of data collection and analysis is the school.

What is Missing?

In developing the EMIS system for Botswana we have attempted to address some of the issues described above by including information about recent studies which are concerned with issues of educational quality at the school level. However, currently, most of the data available in Botswana are quantitative, national-level information. There is a preponderance of ***Input*** data, primarily related to the existence of resources (schools, teachers, students, facilities) but very little information about the quality of school management, teachers' instruction or curriculum quality, factors that are essential to measuring the efficiency of an educational system.

The database does not currently include information on ***Community Participation*** nor on ***School Management*** (see Figure 1). However, references to research carried out on these topics, such as USAID-funded headmaster and teacher incentives research and classroom observation studies, will be incorporated. Additionally, new research results will be added to the database as they become available.

Dr. Kent Noel, former Chief-of-Party for the USAID-funded Botswana Junior Secondary Educational Improvement Project (1992) argues that while national-level information is useful, we need to be concerned about the quality as well as the quantity of educational products. He contends that monitoring of quality should take place not just at the national and school level but at all points in between. Noel believes that the lack of information in the Botswana EMIS on the curriculum development and implementation process is a serious omission. He states that there is a need to pay more attention to factors that affect curriculum quality and efficiency, particularly those relating to the design, development, implementation and evaluation of curriculum materials. He goes on to assert that the EMIS needs to include data from all categories of information (Context, Input, Process, Output, Outcome). This would assist policy makers in making decisions concerning

how time, money and other resources could best be spent in improving curriculum quality. The database should be modified to include such information.

Another critical area that was omitted from the preliminary version of the system is university-level information. The decision to exclude university data from the first year's data collection was made purely on the basis of the limited time available to write the programs and collect the data. These data should be added to the system as soon as possible.

A major gap in existing information also relates to cost data. Although budget information is relatively easy to obtain, very little cost data is currently available. This is particularly true for primary education, where school budgets are decentralized and are the responsibility of the Ministry of Local Government and Lands. All teachers employed by the Unified Teaching Service are paid by the Ministry of Finance and Development Planning. Despite the fact that these records are computerized, it has not been possible to obtain a breakdown of teacher's salaries by level (primary, junior secondary, and senior secondary). Consequently, the cost analyses carried out by the Planning Unit are frequently based on estimates, rather than actual figures. Similarly, cost analyses have not been carried out for many of the activities outlined in the National Development Plan (NDP). For example, the education section of NDP 7 states that during the next plan period, the Ministry of Education will begin the process of localizing the Cambridge (Secondary School Leaving) Exam. Activities are to include training of examiners and markers, writing and adapting syllabi, procuring equipment and planning physical facility requirements. However, no cost analyses have been conducted to determine initial and recurrent costs of implementing these activities. Cost data of this nature are imperative to accurately assess system efficiency.

OTHER ISSUES

Dissemination of Information

Data will be made available to all heads of Departments, central MOE officials, and donor agencies in the form of an annual report. Dissemination should not be limited to the central level of administration but should include the school and district level as well. Copies of the annual report will be provided to Field Education Officers, District Education Officers, Headmasters/ Headmistresses, Teacher Training College Principals and Education Centre Directors. The Primary and Secondary Departments have found that disseminating statistical information to the school and district level has resulted in increased cooperation in data gathering efforts and contributed toward better management and record-keeping practices by those required to provide data.

Sustainability of the Information System

As noted earlier, most of the data contained in the EMIS are derived from existing MOE databases. Although this has substantially facilitated the data collection process, the continuation of the EMIS is, to a large extent, contingent upon the continued operation of these systems. However, several of the systems are presently faltering due to a shortage of trained staff and the high rate of staff turn-over. Individuals responsible for operating the Primary and Technical Education Department databases have left the Ministry and have not been replaced. Additionally, database managers for every existing database within the MOE have reported problems in finding sufficient staff to enter and maintain data. Similarly, the person in the Planning Unit responsible for operating and updating the centralized EMIS has many other responsibilities, with little time for maintaining the system. These problem must be resolved if the system is to be sustained over time.

Lessons Learned

In the process of designing and implementing an Educational Management Information System for Botswana, several procedural/organizational issues have emerged. In addressing these issues a set of basic operational guidelines was developed. These are described below:

1. Decisions regarding the content of the EMIS must be made in consultation with parties from all departments expected to provide data. Most department heads and data managers are regularly bombarded with requests for information. If they do not consider the data to be important, they will not be willing to take time away from other tasks to collect it. In deciding what to include, one must carefully consider the questions: 1) who will use the information; 2) what will it reveal about the efficiency of the educational system; and 3) how will the information be used?

2. It is important that a permanent member of the Ministry staff be assigned responsibility for collecting and maintaining the system. In addition, other staff members need to be assigned to assist this individual. Because of high staff turn-over, it is imperative that more than one person be trained in maintaining the system. Retaining staff trained in data entry and analysis continues to be a problem for all departments in the MOE, as well as other Ministries. Once individuals are trained in using computers, they are often able to double or triple their salaries by moving into the private sector. Incentives must be found to retain trained staff.

3. A users' manual must be provided, containing complete system documentation and clear and detailed written instructions for operating and updating the system. Instructions must be easily understood by someone who has never operated a system of this type.

4. The system must be flexible enough to allow for modifications as more data needs change and more information becomes available.

5. The system must have support from top administration. Data collection is time consuming for those responsible for updating the information system, as well as for those who must provide the data. If the system is to be sustained over time, both the ***data collectors*** and the ***data providers*** must perceive that top-level administrators value the information.

6. Because each department maintains its own database, department heads and database managers must have an interest in receiving information about other departments. Consequently, it is crucial that the EMIS be demonstrated and its potential benefits be explained to those in key decision-making positions, to department heads and to those responsible for providing the data. Furthermore, the information must be both timely and accurate.

Next Steps

As previously noted, this information system is a first step toward addressing data problems within the Ministry of Education. It should be viewed as a starting point rather than a completed system. It is important that additional data be gathered to fill information gaps and that the system be to modified to accommodate changing information needs. Further, if the system is to survive, staffing problems must be resolved. Fortunately, a recent decision by the Government of Botswana to create an Education Planning and Statistics Division within the Ministry of Education represents significant progress toward this end. Presently, Planning Unit staff must divide their time among many competing demands, with information collection and database management ranking low in priority. The creation of the new division will assist in alleviating this situation, with the division consisting of five units:

- Education Projects, Monitoring and Evaluation;
- Educational Planning;

- Educational Information and Statistics;
- Educational Research; and
- Division Management.

This arrangement will provide staff specifically responsible for the collection and maintenance of educational information. In addition, a research component will enable the system to be expanded to include data which are not currently available. Having an EMIS system already in place will make the initial phase of organizing the work of the Information and Statistics component considerably easier. One of the first tasks faced by this unit will be to work with the individual MOE departments to ensure that the departmental databases are sustained.

The development of a systematic means of tracking and coordinating data within the Ministry of Eduction has been a long and arduous process. This system, which has evolved over several years, is a culmination of the work of many individuals. The MOE is now in a position to reap the benefits of this work. Through the systematic collection, analysis and dissemination of information about the educational system, the Ministry will be better able to assess the success and usefulness of its educational programs. The availability of such information to decision makers should lead to more effective policy and a more efficiently operating educational system.

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APPENDIX A
INDICATORS OF EFFICIENCY FOR BOTSWANA EDUCATIONAL MANAGEMENT INFORMATION SYSTEM

1. CONTEXT

SOCIOECONOMIC/DEMOGRAPHIC BACKGROUND (To be Added:)

2. INPUT

TEACHER MANAGEMENT:

(Disaggregated by Dept. for Primary; Jr. Secondary; Sr. Secondary; Teacher Ed; Technical; Ed.; Non-formal; Brigades)
- Qualified male teachers
- Qualified female teachers
- Unqualified male teachers
- Unqualified female teachers
- Total no. teachers**
- % Headteachers male
- % Headteachers female
- Average age of teachers
- Total no. of expatriates
- Annual new hires
- Annual terminations
- Annual transfers

(Aggregated all Depts.- UTS Totals)
- Same as above.

FINANCIAL MANAGEMENT:

(Disaggregated by Dept. for Primary; Jr. Secondary; Sr. Secondary; Technical Ed.; Non-formal; Teacher ed; Headquarters)
- Total Dept. allocation
- Personal Emoluments allocation
- Travelling & Transport allocation

3. PROCESS

EDUCATIONAL QUALITY:

(Disaggregated by Dept. for Primary; Jr. Secondary; Sr. Secondary; Non-formal)
- No. teacher training workshops
- Total workshop attendance
- % of teachers attending workshops during year
- No. school inspections

(For Teacher Education:)
- No. of Ed. Center staff
- No. of national teacher training workshops
- Total teacher attendance
- Avg. cost per national workshop
- Avg. cost per school -based workshop

(For Bursaries:)
- Total scholarship grads.
- Total scholarships issued in 4 yr. or more degree progs.
- Total scholarship grads. from 4 yr or more degree progs.

(For UTS:)
- Total no. teachers
- % Unqualified
- % with Primary Teacher Certificate
- % with Primary Teacher Diploma
- % with Degree in Primary Ed.
- % with 2 yr. Diploma in Sec. Ed.

4. OUTPUT

STUDENT ACHIEVEMENT/ ATTAINMENT:

Dept. for Primary; Jr. Secondary; Sr. Secondary; Non-formal)
- Standard 7 enrollment*
- No. sitting for PSLE*
- % grade above D*
- % completing Std. 1 - 7 cycle*
- % continuing to JC*
- Form 2 enrollment*
- No. sitting for JC exam
- % grade above D*
- % completing Form 1 - 2 cycle*
- % continuing to sr. sec.
- Form 5 enrollment*
- No. sitting for GCE exam
- % grade above D*
- % completing Form 3 - 5 cycle*

(For Technical Education:)
- % Graduates by center*
- % Graduates by center with credit*
- % Graduates by center with pass*

(For Bursaries:)
- No. scholarship graduates*

5. OUTCOME

ECONOMIC OUTCOMES:
(To be added from research references)

ACADEMIC OUTCOMES:
(To be added from University of Botswana)

* See Educational Quality
** See Student Management

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1. CONTEXT	2. INPUT	3. PROCESS	4. OUTPUT	5. OUTCOME
	FINANCIAL MANAGEMENT (cont'd): General Expenses & Supplies allocation Maintenance & Running Expenses allocation Institutional Running Expenses allocation Training allocation Special Expenditure allocation Avg. teacher salary Est. total teacher cost Est percent of MOE budget for teachers (For Teacher Education:) % Dept. budget for TTCs % Dept. Budget for COEs % Dept. Budget for Ed. Centers % Dept. Budget for In-Service % Dept. Budget for Breakthrough (For Brigades:) Subsidy for Brigades Avg. subsidy per trainee Avg. teacher salary Total est. teacher cost **RESOURCE MANAGEMENT:** (Disaggregated by Dept. for Primary; Jr. Secondary; Sr. Secondary) Total no. of schools Total enrollment Council-owned schools Mission-owned schools Private-owned schools Govt. schools Govt.-aided schools Adult/evening schools Schools with Special Ed. Total classrooms	**EDUCATIONAL QUALITY:** (cont'd) % with 3 yr. Diploma in Sec Ed. % with 4 yr. University Certif. % with Post Grad. Diploma % with University Degrees (Bachelors, Masters PhD.) Post Grad. Diploma **EQUAL OPPORTUNITY:** (Disaggregated by Dept. for Primary; Jr. Secondary; Sr. Secondary; Non-formal) Enrollments by district % male students by district % female students by district Student/teacher ratio by district Student/classroom ratio by district % PSLE grade above D by district % JCE grade above D by district % GCE grade above D by district (For Teacher Ed.:) TTC & COE graduates by district & gender (For Technical Ed.:) Enrollment by center & gender Hostel spaces by center (For Brigades:) Scholarships by district Graduates by district		

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1. CONTEXT	2. INPUT	3. PROCESS	4. OUTPUT	5. OUTCOME
	RESOURCE MANAGEMENT (cont'd):			
	Total streams			
	Total teachers			
	Total teacher houses			
	Total books issued			
	Total Dept. Officers			
	Total hostel spaces			
	Students per school			
	Students per teacher			
	Rooms per school			
	Streams per school			
	Houses per school			
	Hostels spaces per school			
	No. books issued per student			
	Total schools per officer			
	Teachers per house			
	(For Teacher Education:)			
	Total no. TTCs/COEs			
	Total TTC/COE classrooms			
	Total TTC/COE enrollment			
	Total TTC/COE streams			
	Total TTC/COE instructors			
	Total teacher houses			
	Total TTC/COE hostel spaces			
	Total no. TTCs/COEs			
	Total TTC/COE courses offered			
	Total Admn. Officers			
	Students per TTC/COE			
	Students per instructor			
	Students per classroom			
	Students per stream			
	Hostels spaces per TTC/COE			
	(For Technical Education:)			
	Total instructors per house			
	Total no. VTCs/Polytech			

1. CONTEXT	2. INPUT	3. PROCESS	4. OUTPUT	5. OUTCOME
	RESOURCE MANAGEMENT (cont'd):			
	Total VTC/Polytech enrollment			
	Total VTC/Polytech courses offered			
	Total VTC/Polytech classrooms			
	Total VTC/Polytech VTC/Polytech instructors			
	Total VTC/Polytech hostel spaces			
	Total Adm. Officers			
	(For Non-Formal Ed.:)			
	Total JC/GCE enrollment			
	Total student enrollment			
	No. study centers			
	Total JC/GCE streams			
	Total JC/GCE teachers			
	Total workbooks issued			
	Total Dept. staff			
	Center Inspection Officers			
	JC/GCE students per teacher			
	JC/GCE students per stream			
	JC/GCE workbooks per student			
	Total students per teacher			
	GCE students per stream			
	GCE workbooks per student			
	Total students per center			
	(For Bursaries:)			
	Internal scholarships issued			
	External scholarships issued			
	Total scholarships issued			
	Total internal scholarships in progress			

1. CONTEXT	2. INPUT	3. PROCESS	4. OUTPUT	5. OUTCOME
	RESOURCE MANAGEMENT (cont'd): Total external scholarships in progress Total of Dept. staff **(For Brigades:)** Total no. Brigades Total Brigades enrollment Total subjects offered Total no. teachers Total no. hostel spaces Total no. teacher houses Total BRIDEC/Brigades staff Courses per Brigade Students per Brigade Students per teacher Houses per Brigade Students per hostel space **STUDENT MANAGEMENT:** **(Disaggregated by Dept.) for Primary; Jr. Secondary; Sr. Secondary)** Total enrollment** % of total primary at standard 1 % of primary at standard 7 % of total jr. sec. at form 1 % of total sr. sec. at form 3 % of TTC at Level 1 % of TTC at Level 2 % of TTC at Level 3 % males % females % Special Ed. % total drops % total repeats Total primary age pop.			

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1. CONTEXT	2. INPUT	3. PROCESS	4. OUTPUT	5. OUTCOME
	STUDENT MANAGEMENT (cont'd): % Primary students enrolled Total jr. sec. age pop. % jr. sec. pop.enrolled **(For Technical Ed.:)** Total VTC enrollment** % apprentices % full-time % upgrade Total Polytechnic enrollment** % incertificate prgms. % in diploma prgms. % in degree prgms. Total Poly. subjects. % male % female Average student age Total Enrollment by center* Total no. graduates by center* % males by center* % females by center* **(For Non-Formal Ed.:)** % JC/GCE male % JC/GCE female % JC/GCE in English % JC/GCE in Math % JC in Setswana % JC/GCE in BK & C % JC/GCE in HSB % GCE in Geography % GCE in History % GCE in P/A Avg. age JC/GCE students **(For Brigades:)** Total enrollment % in year 1 % in year 2 % in year 3 % male % female Total dropouts % male dropouts			

* See Educational Quality
** See Student Management

1. CONTEXT	2. INPUT	3. PROCESS	4. OUTPUT	5. OUTCOME
	STUDENT MANAGEMENT (cont'd): % female dropouts Total new applicants % applicants accepted Enrollment in trade programs by type* % female by type trade* **(For Bursaries:)** No. 4 yr. or more internal graduates* Total no. scholarships issued* No. 4 yr. or more external graduates No. of < 4 yr. internal graduates No. of < 4 yr. external graduates % all graduates female % all graduates male **LOCAL COMMUNITY SUPPORT:** (To be added to research references)			

* See Educational Quality

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Box 1 depicts the EMIS Main Menu. Data are stored by Department/ Functional area. Each of the departmental databases listed on the Main Menu contain data from the six categories illustrated in Box 2.

BOTSWANA MINISTRY OF EDUCATION
EFFICIENCY INDICATORS
MAIN MENU

---

1 --> Primary Indicators
2 --> Junior Secondary Indicators
3 --> Senior Secondary Indicators
4 --> Teacher Education Indicators
5 --> Technical Education Indicators
6 --> Non-Formal Education Indicators
7 --> Brigades Indicators
8 --> Bursaries Indicators
9 --> UTS Indicators
10 --> Curriculum Dev. Indicators
11 --> Headquarters Indicators
12 - > Data References
13 --> Create System Backup
14 --> Data Update
15 --> Exit

ENTER SELECTION--->

Box 1 Main Menu

The menu shown in Box 2 (Primary Education Menu) appears on the screen after selecting Option 1 (Primary Indicators) on the Main Menu.

PRIMARY EDUCATION
EFFICIENCY INDICATOR CATEGORIES

---

1 --> Resource Management

2 --> Student Information

3 --> Teacher Information

4 --> Educational Quality

5 --> Equal Opportunity

6 --> Financial Management

7 --> Data Entry Form

8 --> Exit

ENTER SELECTION--->

Box 2 Primary Education Menu

1.0 PRIMARY EDUCATION
1.1.1 RESOURCE MANAGEMENT (Screen 1)

COMPARISO N YEAR[a] = 1989

No. primary School	584
Total enrolment	275,437
Council-owned schools	540
Mission-owned schools	17
Private-owned schools	27
Adult/Evening schools	N.A.
Schools with Special Ed	N.A.
Total classrooms	5,775
Total streams	8,218
Total teachers	8,529
Total teacher houses	N.A.
Total books issued	N.A.
Total Dept. Officers	N.A.

Box 3

MOST RECENT YEAR[a] = 1991

No. primary schools	654
Total enrolment	308,840
Council-owned schools	582
Mission-owned schools	11
Private-owned schools	61
Adult/Evening schools	15
Schools with Special Ed.	N.A.
Total classrooms	6,627
Total streams	8,627
Total teachers	9,709
Total teacher houses	2,634
Total books issued	N.A.
Total Dept. Officers	41

Box 4

Box 3 Notes: [a] Source: Central Statistics Office, 1989.
Box 4 Notes: [a] Source: Primary Department.

1.0 PRIMARY EDUCATION
1.1.2 RESOURCE MANAGEMENT (Screen 2)

COMPARISON YEAR[a] = 1989

National Average Ratios	
Students per school	471:1
Students per teacher	32:1
Rooms per school	9:1
Streams per school	14:1
Houses per school	N.A.
Issued books per student	N.A.
Schools per officer	N.A.

Box 5

MOST RECENT YEAR[a] = 1991

National Average Ratios	
Students per school	472:1
Students per teacher	32:1
Rooms per school	10:1
Streams per school	13:1
Houses per school	4:1
Issued books per student	N.A.
Schools per officer	15:1

Box 6

Box 5 Notes: [a] Source: Central Statistics Office, 1989.
Box 6 Notes: [a] Source: Primary Department.

1.0 PRIMARY EDUCATION
1.2 STUDENT MANAGEMENT

COMPARISON YEAR[a] = 1989		
Total Enrolment[b]		275,437
Standard 1	46,277	17%
Standard 7	37,031	13%
Total males	133,608	49%
Total females	141,529	51%
Special Ed.		%
Total dropouts[c]	1,765	1%
Total repeaters[c]	13,594	5%
Est. primary age pop.[d]		227,984
Net enrollment ratio[e]		92.5%
Gross enrollment ratio		121%

Box 7

MOST RECENT YEAR[a] = 1991		
Total enrolment[b]		308,840
Standard 1	51,235	16%
Standard 7	39,938	12%
Total males	150,205	49%
Total females	158,635	51%
Special Ed.	503	0%
Total dropouts[c]	2,865	0%
Total Repeaters[c]	14,154	5%
Est. primary age pop.[d]		270,322
Net enrollment ratio[e]		-
Gross enrollment ratio		114%

Box 8

Box 7 Notes:
[a] Source: Central Statistics Office, 1989 (except where noted).
[b] Includes repeaters.
[c] As % of current year total.
[d] Source: CSO, *Population Projections: 1981-2000*, 1987.
[e] Includes students age 7-13.

Box 8 Notes:
[a] Source: Primary Department (except where noted).
[b] Includes repeaters.
[c] As % of current year total.
[d] Source: CSO, *Population Projections: 1981-2000*, 1987.
[e] Includes students age 7-13.

1.0 PRIMARY EDUCATION
1.3 TEACHER MANAGEMENT

COMPARISON YEAR[a] = 1989

Trained male tchrs.	1,537	18 %
Trained female tchrs	5,675	66 %
Untrained male tchrs	210	2 %
Untrained female tchrs.	1,107	13 %
Total no. of teachers	8,529	
Percent headteachers male	N.A.	
Inrcent headteachers female	N.A.	
Average age all teachers	N.A.	
Total no. expatriates	248	2%

Box 9

MOST RECENT YEAR[a] =1991

Trained male tchrs.	1,779	18%
Trained female tchrs.	6,866	71%
Untrained male tchrs.	195	2%
Untrained female tchrs.	868	9%
Total no. of teachers	9,708	
Percent headteachers male		56%
Percent headteachers female		43%
Average age all teachers		40
Total no. expatriates	53	0%
Annual new hires	1,313	13%
Annual terminations	21	0%
Annual transfers	475	5%

Box 10

Box 9 Notes: [a] Source: Central Statistics Office, 1989.

Box 10 Notes: [a] For % trained/untrained, male/female teachers & total teachers source is Primary Department; (figures include all teachers); all other figures are from UTS.

[b] Figures for UTS-employed teachers only (from UTS database) are:
Total no. primary teachers = 9,575

Trained male teachers =	1,603	17%
Trained female teachers=	6,467	68%
Untrained male teachers=	239	2%
Untrained female teachers=	1,266	13%

1.0 PRIMARY EDUCATION
1.4 QUALITY INDICATORS

COMPARISON YEAR = 1989

Standard 7 enrolment[a]	37,031
No. sitting for PSLE[b]	38,073
% of PSLE grades above D	75%
% of Std. 7 students continuing to Form 1[c]	60%
% of students who sat for PSLE admitted to Form 1[d]	60%
Std. 1 to Std. 7 progression rate[e]	91%
Std. 1 to Form 1 progression rate[f]	69%
Teacher training workshops	N.A.
Total workshop attendance	N.A.
% of teachers attending workshops during this year	N.A.
No. of school inspections	N.A.

Box 11

MOST RECENT YEAR = 1991

Standard 7 enrolment[a]	39,938
No. sitting for PSLE[b]	38,223
% of PSLE grades above D	72%
% of Std. 7 students continuing to Form 1[c]	81%
% of students who sat for PSLE admitted to Form 1[d]	84%
Std. 1 to Std. 7 progression rate[e]	89%
Std. 1 to Form 1 prgression rate[f]	85%
Teacher training workshops	N.A.
Total workshop attendance	N.A.
% of teachers attending workshops during this year	N.A.
No. of school inspections	N.A.

Box 12

Box 11 Notes:

[a] Source: Central Statistics Office (CSO), 1989.
[b] Standard 7 students sitting for Primary School Leaving Exam (PSLE) in 1989; Source: CSO, 1989.
[c] Percent of 1989 Std. 7 students entering Form 1 in 1990 (gross progression rate, including repeaters); Source: CSO, 1989; 1990).
[d] Percent of students who sat for PSLE who were admitted to Form 1 in 1990.
[e] Std. 1 (new entrant) students beginning in 1983 and progressing to Std. 7 in 1989; gross progression rate, including repeaters is 114%; Source: CSO, 1990.
[f] Std. 1 (new entrant) students beginning in 1983 and progressing to Form 1 in 1990; gross progression rate, including repeaters is 69%; Source: CSO, 1990.

Box 12 Notes:

[a] Source: Primary Department.
[b] Std. 7 students sitting for PSLE in 1991; Source: Secondary Department.
[c] Percent of 1991 Std. 7 students entering Form 1 in 1992; (gross progression rate, including repeaters); Sources: Std. 7 enrolment from Primary Department; Form 1 enrolment figures from Secondary Department.
[d] Percent of students who sat for PSLE who were admitted to Form 1 in 1992.
[e] Std. 1 (new entrant) students beginning in 1985 and progressing to Standard 7 in 1991; gross progression rate is 104%; Sources: CSO, 1990; Primary Department.
[f] Std. 1 (new entrant) students beginning in 1985 and progressing to Form 1 in 1992; gross progression rate is 84%; Sources: CSO, 1990; Primary Department.

1.0 PRIMARY EDUCATION
1.5 INDICATORS OF EQUAL OPPORTUNITY
MOST RECENT YEAR[a] =1991

DISTRICT	ROLL	%BOYS	%GIRLS	STUD:TCH	STUD:ROOM
NORTH EAST	12,393	51	49	29 : 1	40 : 1
CENTRAL NORTH	25,965	50	49	31 : 1	48 : 1
CENTRAL CENTRAL	54,982	49	50	31 : 1	49 : 1
CENTRAL SOUTH	25,698	49	50	33 : 1	52 : 1
KGATLENG	14,344	49	53	30 : 1	42 : 1
KWENENG	39,065	46	51	32 : 1	48 : 1
SOUTHERN	38,764	48	51	31 : 1	46 : 1
SOUTH EAST	8,343	48	51	30 : 1	38 : 1
KHALAGADI	8,967	48	51	26 : 1	36 : 1
GHANZI	6,681	49	50	29 : 1	37 : 1
NORTH WEST	25,261	48	51	30 : 1	49 : 1
GABORONE	20,655	48	51	33 : 1	46 : 1
FRANCISTOWN	10,781	48	51	33 : 1	43 : 1
LOBATSE	6,010	46	53	36 : 1	49 : 1
SELEBI-PHIKWE	8,534	47	52	36 : 1	53 : 1
JWANENG	2,397	48	51	31 : 1	50 : 1

Box 13

Box 13 Notes: [a] Source: Primary Department

1.0 PRIMARY EDUCATION INDICATORS
1.6 FINANCIAL INDICATORS

COMPARISON YEAR[a] = 1989	
Total MOE budget	P 220,480,660
% for Primary Dept.	0%
Total Dept. Budget[a/c]	P 1,850,140
% for sub head 701	75%
% for sub head 702	7%
% for sub head 703	1%
% for sub head 704	5%
% for sub head 706 & 707	2%
% for sub head 708 & 709	7%
% for sub head 710 & 711	1%
% for sub head 726	0%
Avg. teacher salary :	N.A.
Est. total teacher cost :	N.A.
Est. % of MOE budget for primary teachers	N.A.

Box 14

MOST RECENT YEAR[a] =1991	
Total MOE budget	378,719,680
% for Primary Dept.	0%
Total Dept. Budget	3,613,780
% for sub head 701[a/c]	69%
% for sub head 702	16%
% for sub head 703	2%
% for sub head 704 & 705	4%
% for sub head 706 & 707	0%
% for sub head 708 & 709	1%
% for sub head 710 & 711	4%
% for sub head 726	0%
Avg. teacher salary :	N.A.
Est. total teacher cost :	N.A.
Est. % of MOE budget for primary teachers	N.A.

Box 15

Box 14 Notes:

[a] *1989/90 Estimates of Expenditure from the Consolidated and Development Funds*, Government of Botswana.

[b] 701 = Personal emoluments
702 = Travelling & transport (internal)
703 = Travelling & transport (external)
704 = General expenses and supplies
705 = Departmental Services
706 = Maintenance & running expenses (equipment)
707 = Maintenance & running expenses (other than equipment)
708 = Institutional running expenses
709 = Government hospitality
710 = Training
711 = Councils, conferences & exhibitions
726 = Special expenditure

[c] Percentages less than 1% are listed as 0.

Box 15 Notes:

[a] Source: *1991/92 Estimates of Expenditure from the Consolidated and Development Funds*, Government of Botswana.

[b] 701 = Personal emoluments
702 = Travelling & transport (internal)
703 = Travelling & transport (external)
704 = General expenses and supplies
705 = Departmental Services
706 = Maintenance & running expenses (equipment)
707 = Maintenance & running expenses (other than equipment)
708 = Institutional running expenses
709 = Government hospitality
710 = Training
711 = Councils, conferences & exhibitions
726 = Special expenditure

[c] Percentages less than 1% are listed as 0.

4

The Development of an Educational Information System: The Case of Nepal

C. Howard Williams

INTRODUCTION

This paper is a reflective description of the development of an educational information system in Nepal. The educational information system is comprised of a Statistical Information System (SIS), Action Research, Educational Indicators, and Evaluation Standards. In developing this system, an organization development approach has been used, in order to assess what educational information and systems would be of most value and use to the Nepal Ministry of Education, under present circumstances.

The Nepal Ministry of Education and Culture, for several pressing reasons, has given a priority to improving its capacity for collecting, analyzing, and using information. First, the history of education, and educational information in Nepal is a relatively recent one. A national system of schooling began in 1951 with 321 primary schools, and 11 secondary schools. Today over 13,000 primary schools cover most of the country. A National Education Plan (1971) introduced new curriculum, increased access through gradual elimination of tuition and textbook charges at the Primary level, and increased educational opportunities in rural areas. The secondary school system in recent years has been expanding somewhat faster than the primary, although even now it still serves less than 20% of the age cohort. Approximately ten percent of Nepal's youth complete grade 10 and, of those, some thirty-five percent pass the Secondary Leaving Certificate.

This tremendous expansion of schooling has placed a heavy demand on the central ministry for developing and maintaining adequate basic data on schools, teachers, and students, to make decisions such as allocation of teacher funding and textbook distribution.
A second factor in making information a high priority is that the provision of schooling in a country such as Nepal is a very loosely coupled enterprise. The rugged terrain, extreme seasonal weather, and a communications and transportation infrastructure which is still in the process of being extended to large population areas, leave much of basic and primary schooling subject to community initiative and support. Implementation of a national curriculum, teacher attendance and teaching quality, and student attendance are, in most cases, better known to the community than to MOEC planners and administrators.

The unavailability of this level of information makes policy and program development problematic, both in having an information basis for quality improvements and in following the effects of policy and program decisions. The lack of information places an additional

constraint on the Ministry in its ability to effectively direct and coordinate donor assistance in education. If a donor agency proposes program assistance in education, based on studies conducted in Nepal by that agency, or on the basis of studies and experience in other countries, it is quite possible that the Ministry will not have available "countervailing" information or data of its own with which to negotiate and shape the donor proposal.

A third factor driving the need for more comprehensive and higher quality data is the democratization of Nepal's government. For approximately six months, beginning in the Spring of 1990, Nepal experienced considerable political and social unrest. A new order was established late in the year with the adoption of a new constitution, based on democratic principles, a multi-party system, and a constitutional monarchy. In May 1991, the first party political elections were held since 1958. The Nepali Congress Party won the election with a simple majority.

The first parliamentary session of the new democracy has recently concluded. A central and priority focus of the first session is on extending and improving support and services to Nepal's rural poor. Nepal is a village-based society, with 91% of the people living in rural areas. Development priorities are to raise the standard of living of these people, with a commitment of 70% of the central budget for rural development. In the newly democratic system, His Majesty's Government has many new opportunities to address the challenges of Nepal development. In order to meet these opportunities, better data will be needed.

The main source of educational information that the MOEC has relied on, to date, has been its own Statistical Information System (SIS), which is administered in the Manpower and Statistics Section of the Planning Division.

In the Fourth Development Plan of Nepal, the Division of Planning was created to handle the data functions of the MOEC. Regular publications of Educational Statistics began in 1970-71. Over the past two decades there have been many changes in the reporting of Education Statistics, and improvements in the type of data reported, in format, and publication schedules.

Under Phase I of the Improving the Efficiency of Educational Systems (IEES) Project (1985-89), an IEES resident advisor was assigned to the MOEC from February 1986 to June 1989. During that period a sustainable data collection and analysis capacity was developed within the MOEC's Planning Division. A focal point, now that data have become so critical, is to what degree are the MOEC data valid and reliable, and whether the data address the critical, priority areas of educational efficiency and improvement. To expand such capacity and bring it more directly to bear on the MOEC's planning activities, AID/Nepal "bought into" IEES Phase II (1990-94) for the services of another resident advisor for two years (1991-93).

Phase II of IEES assistance in Nepal is focused almost exclusively on concentrated development of the MOEC's education information system, specifically on establishing an

"Education Management Information System" (EMIS) and conducting policy-oriented research. In this case of developing an information system, it may be useful to distinguish between a basic Statistical Information System (SIS), and an Education Management Information System (EMIS).

The reference to "EMIS" in the agreement for IEES Phase II assistance is probably an acknowledgement of the large currency "EMIS" has today in educational development efforts, perhaps as much as it may reflect what is actually expected from this assistance effort under the present circumstances. An EMIS would provide regular, timely information on project or program status and implementation for management monitoring, decisions and actions (USAID, 1990). This type of system requires a fairly deep level of trained personnel and technology which will be held online for the purposes of a particular project or program. The costs of dedicating the requisite staff and technology to a selected effort, in the case of Nepal, must be weighed against a larger cluster of information needs which presently face the Ministry, along with its capacity for generating, analyzing and using the information. For this reason, a more general "Education Information System" (EIS) is being developed, which incorporates the Statistical Information System (SIS), a set of educational efficiency indicators, an action research program, standards for the conduct for program evaluation, and an analytic capacity for ad hoc requests, which may be expected in a new democracy.

An information system must be technically sound and usable. Equally important, it must produce information which is valuable and useful. The dimensions of (a) technically sound and (b) valuable and useful represent an important distinction.

The need for information systems which are technically sound is supported by experience in conducting educational research and developing EMIS's throughout the world. Chapman (1991) points out that donor agencies and ministries of education have recognized the need for better education data for improving quality and efficiency. USAID/Bureau of Science and Technology (1990) has produced a "Lessons Learned" review of experience in EMIS development in Third World Countries, based on work done by Moses and Thiesen.

The dimension of value and usefulness draws more from experience in design and implementation approaches and processes. In cases of technical assistance, the need for an interactive relationship, with the intent of reaching a valuable and useful product, in this case an information system, has been described by Adams and others (Comparative Education Review, 1990). Lind (1991) has raised this issue expressly in regard to designing and developing useful EMIS' in the Third World.

Conceptual and practice-based guides for successfully engaging in a consultative, interactive relationship for agreed upon ends may be found in the organization development literature. Applied experience in using an organization interventionist approach to educational planning has been described by Cresswell and Williams (1991).

It may be helpful, at this point, to make a brief reference to the Psacharopoulos-Adams debate (1990) on what constitutes valid and useful information for educational planners. It seems that Psacharopoulos' position can be summarized as "good research produces sensible results, which sensible people (policy makers and planners) should use." And, it would seem, Adams' response is that "good research produces results which are sensible and valuable to certain persons under certain circumstances."

Psacharopoulos' position, that substantive lessons are compelling ones, is representative of Chin and Benne's (1976) characterization of the rational-empirical strategy for change. Why, then, would we need to spend the additional time and energy on diagnosing and engaging in the organization itself if sufficient attention and skill has been given to developing a knowledge base on educational effectiveness? Adams' call for interactive processes is representative of the normative re-educative model for change, but goes deeper into grounding the planning of change in the culture of the existing organization and participants. It is at this level that "value and usefulness" of data, or a larger organizational intervention may be best informed.

The interactive relationship among the IEES advisor(s) and the Ministry of Education and Culture, in this present case, has been guided by models and concepts borrowed from the organization development field. This approach to developing the education information system has produced a configuration of several types of "information systems," e.g., research, evaluation, and statistics. Each of these components of the information system is recognizable by its own conceptual base, methodology, and techniques. Yet no single component is a wholly complete, stand-alone operation, aside from the basic SIS already established by the Ministry. Instead, the consultative, interactive relationship has produced a configuration of information functions and activities which appear to be the most valuable and useful, under the present circumstances of Nepal's Ministry of Education.

In using the OD approach to developing the information system, three activity areas have been central: an on-going diagnosis of the system, team building, and action research. These three activities are interdependent, and have been implemented accordingly.

A diagnostic stage has been a necessary prerequisite to engaging in a consultative relationship for development of the information system. This diagnosis has been carried out at two levels. An initial series of diagnoses was conducted under Phase I of IEES (1985-89). During this period, IEES provided assistance through (a) a long-term advisor to the Manpower and Statistics Section (3 years), (b) an Education and Human Resources Sector Assessment, and (c) a research activity on the existing information system at the Ministry.

The IEES Phase II diagnosis has been more of an "emergent" design, as it relies primarily on the long-term presence of the advisor. This approach is necessarily unstructured for three reasons:

1. The agreement with the MOEC is for (a) development of an EMIS and (b) the conduct of research. It is not an agreement for "organization development," as such. Consequently, there is no prior understanding between IEES and the MOEC for utilization of specific OD goals, references, or activities, beyond development of the Ministry's Information System and the production of research results. The OD concepts, instead, are used as guiding references for the approach in accomplishing the EMIS and research objectives.

2. At present, there do not seem to be a ready set of experience-based OD models for designing and implementing educational system interventions in the Third World. This would be in particular reference to effective engagement with an existent educational organization so that the intervention constitutes organizational improvement (in effectiveness or efficiency) beyond the project deliverables. The problem of engagement has been clearly identified by what are now common references to "transfer," "capacity," and "sustainability." These references acknowledge the need for organizational ownership over the program and/or the product. The OD approach, in a sense, "front-loads" the ownership to the very beginning phases of diagnosis and design, so that the organization will not take on what it doesn't value or can't use. The development or adaptation of OD models for educational intervention would seem to be a useful contribution to educational development.

3. The long-term presence of an advisor allows for interactive participation throughout the process of diagnosis and design of the intervention. The diagnosis can "afford" to be open, following where the opportunities lead for determining organization functions, roles, culture and values, i.e., those things which make or break an intervention. The consistent thread of continuity through this open, collaborative process has been to develop the EMIS and conduct the research. To the extent that we have focused on value and utility of those products, we have entered into an OD approach to determine the role, shape, and nature of information so that it will be valuable and useful. (And, if it is valuable and useful, it is more likely to be sustainable.)

This ongoing diagnosis has attempted to make the conditions of the Ministry more known and discussable in designing, planning, and implementing the information system. Consultation among the advisor and system participants has helped to assess the prevailing climate and culture, and how the system can best be supported by, and serve the various individuals and groups in education.

Organizational diagnosis: conditions for success in using an OD approach. In undertaking an OD approach for development of the Ministry's information system, it was important to assess whether the conditions in the Ministry were conducive or constraining to using an OD approach. French and Bell (1984) outline twelve conditions which they see as

consistently important to "successful evolution of organizational development efforts" (p. 215).

The conditions which are cited by French and Bell are considered important contributors for optimal success for an OD effort. As previously stated, the use of OD in this case of developing the Ministry's information system has been primarily as a guiding set of references for effective intervention. It is felt, however, that reflection on these conditions for a successful, full-blown OD effort is still useful in gauging whether the OD approach was likely to be accepted as an appropriate means of doing business, and the likelihood of success in using OD constructs, such as action research and team building.

Following each condition statement, below, is a summary assessment of that condition in the Ministry of Education, as perceived by the IEES resident advisor. As the resident advisor has taken an interactive, consultative approach to diagnosis, design, and development, these conclusions are based on numerous descriptive and reflective discussions with Ministry officials. This paper, itself, will be reviewed by members of the EMIS Committees and research team as part of the ongoing, consultative relationship for development of the information system.

1. **Perceptions of organizational problems by key people and perceptions of the relevance of the behavioral sciences in solving these problems.** Key Ministry officials (Secretary, Additional Secretary, Joint Secretaries), other HMG officials, and professors from the national university have commented, without dissension, that the SIS needs strengthening, particularly in validating school level record keeping and in refining data definitions.

   Following Nepal's democratization, there is now the additional opportunity to use information for policy and program decisions below the level of the Palace, a condition which is new to the Ministry. Pressure from the Parliament has been joined with this new opportunity, as parliamentarians have already begun asking what the specific deliverables are, from the Ministry to their constituent districts. These factors have focused the Ministry's attention to developing and maintaining a more comprehensive and higher quality information system.

   The means for developing a more responsive information system is acknowledged by key participants to be an organizational issue, over and above the technical requirements for accomplishing it.

2. **The introduction into the system of a behavioral scientist-consultant.** IEES is somewhat unique, from the perceptions of Ministry officials, in that its main input is the placement of a resident advisor for a two-three year assignment with the Ministry of Education. The Ministry is more accustomed to larger projects which provide more capital investment in the system. The acceptance of the IEES package constitutes an acceptance of the internal consultant. The former and current IEES

resident advisors have had training and experience in administration, planning, and evaluation.

3. **Initial top-level involvement, or at least support from a higher echelon with subsequent top-management involvement.** The Permanent Secretary of the Ministry has been an active supporter of educational information systems development, and IEES assistance to that effort. The Secretary served previously as Joint Secretary for Planning, and Additional Secretary for the Basic Needs Program, an overall program initiative of the Ministry. The Secretary chairs the EMIS Steering Committee, and has been a leader in the development of the Ministry's SIS and research agenda. The Secretary also recently chaired a two-day inter-Ministerial workshop on the Ministry's information system. The seminar was co-chaired by the Vice-Chairman of the National Education Commission, which is tasked with development of the next National Education Plan for submission to the upcoming parliamentary session.

   The Additional Secretary, and Joint Secretaries for Primary Education and Planning have been active collaborators in the identification of priority issues and subsequent design of information systems activities and development. This input has been stated by them to be guided by their need to use the information, and the need for it to be of high quality.

4. **Participation of intact work teams, including the formal leader**. The Manpower and Statistics Section of the Planning Division has been the primary group responsible for the SIS functions of the Ministry. This group now comprises the main working team of the EMIS Technical Committee, which handles the day-to-day development functions of the EMIS. The information system design and activities are the result of section staff (EMIS technical Committee) analyses, deliberations, and planning, in consultation with the Joint Secretary for Planning and the Secretary.

   The Under-secretary of the Manpower and Statistics Section (section head) serves as member secretary for the EMIS Steering Committee. The Joint Secretary for Planning has served as Chair of the EMIS Technical Committee. These assigned roles are consistent with the normal functions of these positions; the more recently assigned EMIS roles provide greater focus and explicit responsibility in regard to the information system.

   The dual roles of the Manpower and Statistics Section staff (MOEC proper, and EMIS) are acknowledged and supported by senior members of the Ministry. The Section staff are called upon regularly for briefing of senior Ministry officials and the National Education Commission, in regard to educational statistics and the information system activities.

5. **The operationalizing of the action research model.** Action research constitutes one of the three main activity areas in OD. Action research, as described by French and

Bell (1984) replicates the steps of the "scientific inquiry," with a particular focus on the processes of data specification and collection, feedback of the data to the client organization, and subsequent action planning. Schein (1980) adds that any assessment of the organization "made to evaluate the effects of a prior intervention itself becomes automatically the next intervention" (p. 242).

French and Bell (1984) emphasize that action planning is both an approach and a process. French and Bell cite Corey's (1953) reference to action research in education as "the process by which practitioners attempt to study their problems scientifically in order to guide, correct, and evaluate their decisions and actions (p. 108)."

Action research outcomes provide solutions to immediate problems, which form the basis for organizational action. This is an appropriate characterization of the research component of the Ministry's education information system. The most recent action research design in this case is, more specifically, "participant action research," which Chein, Cook, and Harding (1948) describe as involvement of the people who are to undertake the action throughout the entire research. This participation increases the likelihood that the recommendations are "feasible and workable" and that the actions are more likely to be carried out. (French and Bell, p. 116).

The action research agenda associated with the development of the information system has occurred in three phases. The first action research activity was conducted under Phase I of the IEES Project. This research was focused on the Ministry's information system, documenting its history, present status and characteristics, and quality. The results from this research on the EMIS included a finding that the school level data were reported from the schools and entered at the central Ministry at a high rate of accuracy (95%) (New Era, 1989). The results of this action research were reported at a national seminar.

A second action research phase consisted of three micro studies on the SIS focusing on (a) current issues in today's information system (see Attachment A), (b) rates of primary school dropouts and repeaters, and (c) a needs assessment survey of SIS data users in the government and the University. The results of these three studies were reported in a two-day workshop for discussion by participants from government agencies and the University.

As part of this workshop, a third action research proposal was introduced for discussion, which was the result of consultation among Ministry officials and IEES representatives. This research is focused on investigating the (a) family, school, and community factors contributing to grade repetition and student attrition in Grade One and (b) what actions parents, school personnel, and community leaders believe can be taken at the community level and by the Ministry to improve student flow in Grade One.

The design of the study is grounded in two premises. First, grade repetition and dropout at the end of Grade One represents one of the most serious constraints to internal efficiency now facing the education sector in Nepal. Second, much is already known about the reasons for first grade repetition and dropout. However, much of the solution for improving student flow will rest on interventions undertaken at the community level. More information is needed on community-school dynamics if effective assistance is to be developed for communities to raise the efficiency of primary education.

The anticipated benefits of this research activity are that the Ministry will have a better understanding of the community level dynamics that might contribute to improving student flow. Second, the design offers a model for action research that the MOEC can use to investigate the impact of interventions aimed at solving other issues in educational quality and efficiency. The research activity will begin by March, 1992 and is expected to be concluded in February, 1993.

6. **Early successes, with expansion of the effort stemming from these successes.** The Manpower and Statistics Section staff had met with early success in improving the SIS, with more timely publications of annual statistics and a positive assessment of the reporting system from the initial action research activity. Although the validity of the school level data is still in question, that is perceived to be a "next step" in strengthening the system rather than being a failure from past efforts.

A high profile success was achieved during Phase I of IEES in the conduct and publication of the Education and Human Resources Sector Assessment (1988). The Sector Assessment Team included MOEC officials, faculty from Tribhuvan (national) University, and IEES Project technical assistants. The Sector Assessment document, now four years old, still serves as a basic information reference for the Ministry. An accomplishment in early work of the EMIS technical group came through conducting a cost analysis of providing free secondary schooling. Team review and cross-examination of cost categories and assumptions demonstrated that the liability to the government would be at least 500% greater than earlier estimates. As a consequence, the ruling party chose incremental implementation of its free secondary school policy, starting with free grade six. This action provided a powerful impetus to the EMIS technical working group, in that its data and analysis could be seen to have a policy impact, even at the Parliamentary level.

The EMIS Technical Committee and Steering Committees have also met with success in developing inter-group working relations, especially with the University. The 1991 workshop on the Ministry's information system included many participants within the Ministry, from other Ministries and the University. The workshop produced thoughtful, workable advice on the SIS, and the research. It also demonstrated that the Ministry could open its internal information program to persons outside of the Ministry and obtain valuable and useful feedback and guidance.

7. **An open, educational philosophy about the theory and the technology of OD.** The IEES resident advisor has been open throughout in discussing objectives, activities, and rationales. This is particularly the case as all programmatic action is arrived at collaboratively and is taken as a Ministry initiative, generally sponsored through its EMIS Steering or Technical Committee.

   Discussion about OD, however, has been limited to focusing on the strengths of the work teams, the inter-group work teams, and the action research, which are key components in an OD program. Since the OD approach used in this case is incremental and evolutionary, attention is given to open, educational discussions about the benefits and disadvantages for each initiative or proposed action. If we proceed, modify, or abandon an idea or proposal, it is a considered Ministry decision.

8. **Acknowledgement of the congruency between OD and many previous effective management practices.** There are several congruencies between the OD-type activities which are being used in developing the information system and in practices already used by the Ministry. The use of work teams is a long tradition in the form of "steering committees" for project assistance and activities. The focus in this case is somewhat less on referent advice and more on active participation in the development agenda.

   The action research model lies somewhere in-between traditional practices of Ministry-sponsored evaluation and University-initiated basic or applied research. Effective practices of each mode, the organizational improvement function of evaluation and the theory and model building of university research, are incorporated into the action research model.

   Thus far, the team building, intergroup team building, and action research have been supported by the Ministry Secretaries as consistent with their ideas for improving and managing the educational system.

9. **Involvement of personnel and industrial relations/human resources management people and congruency with personnel policy and practice.** There are presently no official positions which are specifically charged with responsibility for internal personnel/human resource development.

   In order to maintain consistency between the OD-type activities and present personnel policies, there have been no assignments or realignments of roles or responsibilities for participants which would be inconsistent with current assignments. Instead, the focus in negotiating work roles and assignments in developing the information system has been to enhance current job roles and performance, in many cases providing an avenue to pursue what is already charged to the individual or section, but may not have been taken up in the absence of a clearly defined focus or product. In this way,

it is expected that unrealistic or dissonant expectations are not being set, and that the developmental activities are building upon existing authority and mandates.

10. **Development of internal OD resources and facilitative skills.** This has been done formally on one occasion. Three Manpower and Statistics Section officers and the IEES resident advisor participated in a three-day organization development workshop in Kathmandu, conducted by a professional OD consulting firm, The Mentor Group, based in Seattle and Hong Kong. The four participants gained insights and skills in agenda setting, establishing effective work groups, and in analyzing organizational problems and prospects for action. A secondary benefit of workshop participation was a further solidification of the EMIS technical working team, as the seminar allowed for group work with specific reference to actual work situations. A follow-up workshop is scheduled to take place four months later to reflect on and analyze changes in the work situation and personal effectiveness, and to reinforce the knowledge and skills presented in the original workshop.

    Facilitative skills are being informally developed and reinforced by these and other members of the information system, particularly the action research team, which has members from the EMIS Steering and Technical Committees, the University, and a private research firm.

    At present, however, there are no plans for additional formal training in OD and facilitative skills.

11. **Effective management of the OD process and stabilization of changes.** Since the relationship between the resident advisor and the Ministry officials for information and planning are interactive and collaborative, positive and negative implications for initiatives and proposals are discussed at length before action is taken.

    Changes are stabilized, in part, because the working members of the EMIS Technical Committee are personally conscientious in producing results which are useful for the Ministry, and prefer efficacy to change for its own sake. Change, in some cases, has not resulted in productive outcomes, causing frustration and disappointment. These cases have been discussed to reflect on what could have been done differently, or if the activity should have been undertaken at all. Reflective discussions have been useful in projecting implications for proposed activities, both in considering organizational costs and benefits, and in designing a procedural strategy.

12. **Monitoring the process and the measuring of results.** In the present case, this is a tough one. There is no pre-existing agreement on OD changes or effects, beyond establishment of an information system and the conduct of research. Monitoring and measuring OD progress, as a cumulative result of the OD approach will tend to be reflective and anecdotal. Surfacing the underlying concepts which have guided the OD approach in this work, through this paper, and discussing them with the

information system participants may serve as a first step in determining whether any OD changes may be specified in measurable terms, or whether that would be valuable or useful for the Ministry.

In the above discussion on diagnosis and development of the educational information system, the Statistical Information System (SIS) and Action Research components have been introduced and described. Two additional components, Educational Indicators and Evaluation Standards, will be described below.

National educational indicators. A proposal and draft set of national educational indicators was developed for review by the participants in the 1991 national two-day workshop on the Ministry's information system (see Attachment B).

The indicator set was proposed for use in organizing data for assessing the status and performance of education in Nepal, monitoring important developments, and showing trends in key dimensions of educational improvements. When the indicator set is established, it may also be used as a reference for the MOEC in prioritizing research and routine data collection by projects and programs, to fill essential gaps, avoid duplication of effort, and to meet the highest priority data needs of the Ministry.

To determine which data can serve as indicators, a series of considerations will be addressed:

a. Are the data useful in telling us something about the educational system?

b. Are the data sufficiently representative?

c. Are the data available and collectible at reasonable cost and effort?

Similarly, we will also address several programmatic considerations:

a. Who should collect the data, and at what level?

b. Who should analyze the data, at what level?

c. How often do we need to collect the data? Will sample data serve adequately, or is census data necessary?

d. Should the MOEC serve as primary collectors of the data or can we use secondary sources?

The "indicators approach" was based on review, compilation and analysis of indicators research conducted at Florida State University (Easton, Holmes, Williams, and duPlessis, 1990) and refined in consultation with the Ministry's EMIS Technical Committee.

The Secretary and other officials expressed their view that the indicators model was particularly helpful as a conceptual reference, in seeing where the strengths and weaknesses of the data system lie. The model was also helpful in discussions for further information system development and activities. For example, consultation with Ministry officials on the topic of MOEC/IEES action research focused initially on school processes, which tends to be the most difficult domain to observe and collect meaningful data. It seemed, then, that this domain would be a good candidate area for action research, collecting valuable and useful data on school processes most of interest to the Ministry, e.g., teaching quality.

The Secretary and other officials acknowledged that the area of school processes is a weak area in terms of data and knowledge on schooling, and that targeted research, using careful sampling, was needed in this area. The focus of discussions on research, however, shifted more to the "action" aspect of the research, that is, the topic for which the Ministry felt the most urgency to address as a national issue in schooling. The Secretary and others expressed their interest in learning more about the phenomenon of student dropouts and repetition, and their concern that these students represented a tremendous cost without related rates of success and attainment. Teaching quality was agreed to be an important area for research and improvement, but was felt to be somewhat secondary (though not unrelated) to effective student participation and progression.

Consequently, it was agreed that the research would focus on family, school, community factors which contribute to, or inhibit, student enrollment, retention, and flow. In addition, the "action research" bias placed an additional emphasis on generating community-based recommendations, or "solutions," to the phenomenon of dropouts and repetition. These solutions, or case recommendations, are expected to focus and guide what the Ministry, or His Majesty's government, can do to support communities in their support of schooling.

Evaluation standards. The evaluation capacity of the Planning Division will be assessed and enhanced as a part of the EMIS workplan. The organizational capability of the central Ministry to conduct extensive evaluations of all programs and projects is not likely to be in place in the foreseeable future, when weighed against other competing program needs. A preliminary "consultative analysis" of the evaluation functions of the MOEC suggests that the most fruitful approach may be for the central MOEC to develop program evaluation standards, along the lines of standards developed by the joint American Educational Research Association/American Evaluation Association Committee and adapted by the State of Florida (1986) and the Government of Botswana (1988).

With reference to an established set of evaluation standards, the actual conduct of evaluation may then be delineated by function and purpose: formative evaluation may be conducted by donor-assisted initiatives for program and project management purposes, and summative

evaluations may be conducted by the central Ministry with technical and financial assistance from the donor-assisted projects.

CONCLUSION

The educational information system which is being developed for Nepal is idiosyncratically comprised of a Statistical Information System (SIS), Action Research, Educational Indicators, and Evaluation Standards. In developing this system, an organization development approach has been used, in order to assess what educational information and systems would be of most value and use to the Nepal Ministry of Education, under present circumstances. This reflective description of the approach used, and activities undertaken will itself be used in this interactive, consultative process for developing the system.

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APPENDIX A

ISSUES IN TODAY'S EMIS

1. RELEVANCY

- Is the data which we are collecting and reporting meeting the needs of the data users?
- Are there different frameworks and formats we can use for reporting?
- Are there any special studies or data collection activities we can do?
- Are we collecting the necessary data, and only the necessary data?
- Is the frequency of our data collection appropriate or not for each type of data? Are we using census data when sample data will be as useful?

2. ACCURACY

- The EMIS study by New Era indicated that we are accurate within 5% in transmitting data from the school records to the MOEC Manpower & Statistics Section for analysis and reporting.
- Our analyses (such as gross and net enrollments) give us some concerns about the accuracy of the data. Are the schools recording and keeping accurate data?

3. TIMELINESS (UP-TO-DATE)

- If the data are seriously delayed, it detracts from their usefulness. Are there problems in the EMIS data process which slow down the data collection and reporting, which we can improve?

4. DECENTRALIZATION OF THE EMIS

•The system presently provides copies of the district summary data to the DEIs and REIs. What can we do to improve data activities and flow at all levels?

	ACTIVITY				
	Collection	Reporting	Storage	Use	Dissemination
Central					
Regional					
District					
School					

5. PRIVATE SCHOOL REPORTING

•According to district reports, private schools are not very responsive in reporting to the DEIs, and we have very little leverage over these schools. What can we do to improve private school reporting?

APPENDIX B

EDUCATIONAL INDICATORS

The M&S Section of the MOEC's planning division has already established data collection and reporting on several key indicators:

I. INPUT INDICATORS

1. *School endowment*

    a. number of schools

2. *Student characteristics*

    a. total enrollments

3. *Teacher characteristics*

    a. teachers' level of training

II. PROCESS INDICATORS

4. *Curriculum quality*

    a. subjects taught

5. *Student participation*

    a. drop-out rate
    b. repeater rate

III. OUTPUT INDICATORS

6. *Student attainment and achievement*

    a. number of students reaching the last grade of cycle
    b. student grade-to-grade progression rates
    c. level examination results (grades 5,7, and 10 (SLC) results)

IV. EQUITY

a. students and teachers, by region, by sex.

Suggested MOEC Education Indicators (by domain)

I. CONTEXT INDICATORS

1. *Socio-economic and demographic background*

a. total/regional population
b. life expectancy at birth
c. purchasing power per household
d. newspaper/radio circulation per 1000 population
e. adult literacy rates
f. number of hours per da. spent on labor for school age children
g. family preference for educating boys vs. girls
h. career expectations for boys and girls
i. evidence of community political participation (e.g., percent) adults casting votes in elections; percent adults attending community meetings
j. number of active community civic organizations

II. INPUT INDICATORS

2. *School endowment*

a. number of schools
b. class to classroom ratio
c. whether furniture is provided
d. the availability of instructional materials

3. *Local/community support*

a. building of school facilities by the community
b. maintenance of school facilities by the community

c. whether a functional parent/teachers committee or association exists

d. the nature and frequency of community-school contacts

4. *Central/regional/district support*

a. the number of textbooks produced
b. the number of school inspection visits by MOEC officers
c. the overall and HMG/MOEC non-personnel expenditures on schooling

5. *Student characteristics*

a. total enrollments
b. the percentage of female students
c. calories consumed per day per person
d. health status of school age children

6. *Teacher characteristics*

a. the number of teachers
b. the percentage of female teachers
c. qualification: training (by level)
d. average salaries
e. attrition rates

III. PROCESS INDICATORS

7. *School management*

a. number of school days per year
b. hours of instruction per day
c. teacher-student ratio
d. school expenditures on facilities and maintenance

INDICATORS OF HEADMASTER CHARACTERISTICS MAY INCLUDE:

e. number of headmasters completing administrative training
f. level of teacher training
g. years experience
h. amount of time spent in classroom instruction

i. amount of time spent on supporting other teachers' instruction
j. amount of time spent in introducing or supporting instructional innovations

8. *Curriculum quality*

a. subjects taught
b. professional judgment of the appropriateness of the curriculum
c. parents' judgment of the appropriateness of the curriculum
d. the degree to which the national curriculum is followed

9. *Teaching quality*

a. the amount of teachers' time spent on instruction
b. the use of instructional materials for instruction
c. the frequency of testing and feedback to students

10. *Student participation*

a. average daily student attendance
b. student time on task
c. drop-out rate
d. repeater rate

IV. OUTPUT INDICATORS

11. *Student attainment and achievement*

a. percentage of students reaching the last grade of cycle
b. student grade-to-grade progression rates
c. results of level exams

12. *Student attitudes and aspirations*

a. the number of students seeking admission into the next level of schooling (grade 5 into secondary schools)
b. the general level of occupational choice for school leavers and school completers

V. OUTCOME INDICATORS

13. *Later academic outcomes*

    a. percent of graduates of the primary cycle entering the following cycle
    b. the number of students entering/graduation from scientific and technical fields

14. *Economic outcomes*

    a. labor force status of cycle graduates
    b. average earnings of cycle graduates
    c. average agricultural productivity of cycle graduates

15. *Social and political outcomes*

    a. number of primary school graduates voting in elections
    b. number of primary school graduates participating in civic organizations
    c. social mobility of primary school graduates, e.g., positive changes in land ownership, income-debt ratios, capital investments, etc.

16. *Feedback to context*

    a. recent primary school leavers' aspirations for family—size, economic, and educational aspirations
    b. recent primary school leavers' participation in community affairs
    c. recent primary school leavers' support for community's schools

5

Educational System Performance Indicators as they Apply to Curriculum Development and Implementation Policy and Planning

Kent L. Noel

INTRODUCTION

Many of the thoughts discussed in this paper are based upon my experience with the Junior Secondary Education Improvement Project (JSEIP), a large-scale education project jointly funded by the Government of Botswana and the United States Agency for International Development (USAID) from 1985 to 1991. While the tasks of my job as an instructional systems design advisor with the project spanned all levels of Botswana's educational system, most of my work was concentrated within the Department of Curriculum Development and Evaluation (CD&E). Within CD&E, I worked with officers in planning, designing, developing, evaluating, and implementing curriculum and in establishing linkages among the units within CD&E and between that department and other Ministry of Education departments. While, a number of my suggestions may be specific to the operational context of Botswana's educational system; it is hoped that they may be of use in other educational contexts and systems as well.

I recently participated in a number of work sessions with other USAID education advisors and planners in Botswana to draft some educational targets and indicators for a strategic educational objective of the USAID mission to be achieved during the next several years. The objective was related to a long term educational project being planned with the Government of Botswana and was to increase Batswana student skills and competence in order for them to better participate in society. Two main targets which were seen as contributing to the strategic objective were derived. One target was to enhance the quality of curriculum and instruction. Another was to establish systems to provide feedback on student learning achievement to the major stakeholders of the system. Related subtargets were to institutionalize appropriate processes and mechanisms required to support and sustain quality curriculum, instruction, and evaluation.

As one might expect, some of the indicators identified to measure the achievement of the strategic objective, targets, and subtargets primarily dealt with outputs like the number of classrooms using new curricular materials, number of teachers trained to teach the new curriculum, number of subject areas using criterion-referenced examinations, and number of classrooms in which continuous assessment was being used.

Less typical and more important to this discussion was an attempt to identify indicators to measure quality in the curriculum development process itself. These included checklists of major functions and skills required by local officers working in the curriculum development sub-system. An assumption was that, by taking yearly "snap shots" of personnel performance of

items on the checklist, one could monitor officers' performances and, hopefully over the time of the project, see an increase in their abilities to operate, sustain, and improve the sub-system in which they were operating.

It would seem that an assessment of the curriculum impact of large-scale educational projects should always include measures of how curriculum development and implementation sub-systems function, not only in terms of the products that are produced but also in terms of the processes that are employed. This would seem especially appropriate when the institutionalization of systematic curriculum development processes are among the project targets. However, assessment of the impact of project curriculum components is not routinely built into the original plans of large-scale educational projects. The plans for educational projects in general tend to focus on products and outputs of curriculum development sub-systems and student achievement indicators as a measure of project impact on curriculum sub-systems. They rarely pay much attention to measures of the effectiveness of curriculum development processes themselves. Also, current educational performance research provides little guidance as to how to gauge quality and efficiency in curriculum development sub-systems and the processes they use. Nor does research provide insight into what combination of sub-system characteristics might have the greatest influence on ensuring that useful curriculum development processes are introduced, used, and maintained beyond the life of a project.

EVALUATION OF CURRICULUM DEVELOPMENT PROCESSES

Educational management information systems (EMIS) have focused on indicators which help inform policy decisions at a macro level such as those made within a Ministry of Education's Planning Unit. This has included system-wide information such as numbers of teachers, schools, pupils, and curriculum materials that are in place and, more recently, school-level data such as indicators of student, teacher, and headmaster performance and attitudes. Educational performance research that addresses the information needs of mid-management levels and those charged with the processes of developing and implementing policy at sub-system levels seems to have been overlooked. At least in the case of Botswana, there has been very little information about the quality of curriculum or the processes required to ensure the development of quality curriculum (Burchfield, 1991). For example, within the context of a production-function framework for studying the performance of educational systems (Easton, et al., 1991), indicators of quality and efficiency of the curriculum development sub-system have mostly dealt with the following categories:

- inputs, such as numbers of officers which staff a curriculum development center and their level of efficiency;

- products, such as the quantity of curriculum materials being produced and the number of teachers prepared to use the materials and to effectively implement the curriculum;

- and outcomes, such as achievement levels of students who have used the curriculum materials.

Even when a "systems" paradigm is used to evaluate an educational system, we have ignored process indicators of quality and efficiency used in developing the curriculum. Those processes include designing, developing, and evaluating curriculum materials and delivering and implementing those materials. Associated with each of the systematic curriculum development processes are general operational processes and functions that are also important to the effectiveness of curriculum and development organizations such as management and supervision, communication and consultation, power sharing and lines of authority for decision-making, production,and delivery.

It is important that information regarding curriculum development processes and organizational operations be collected, analyzed, and made available to curriculum policy decision makers for several reasons.

First, in a centralized educational system such as that found in Botswana, the curriculum development component is a primary translator of national educational policy into concrete curriculum products. Research would focus much needed attention on the processes of the translation and might lead to a realistic assessment of the time and effort spent in the planning, training, and organizational aspects of curriculum development. With that information, curriculum policy makers could make better informed decisions about what curriculum initiatives could feasibly be introduced into the educational system and when they could be introduced as well as the capacity of the current curriculum organization's capacity to handle those initiatives.

Second, regardless of the level at which the technology is implemented (e.g., the school level or the central ministry level), it is likely that some change must occur within the curriculum development level and/or in the technology itself before it can be accommodated, institutionalized and sustained within the curriculum development sub-system. Research can help identify ways in which the curriculum processes or new educational technologies must be adapted in order to become functional.

Third, like teachers and students, curriculum developers have characteristics, abilities and attitudes that affect their performances and they require incentives to stay on the job and to perform their jobs well. Research could help identify the qualities of a curriculum development sub-system which positively or negatively affect officer job performance and, indirectly, affect the quality of curriculum products.

Recognizing that "the provision of well-designed curricula and materials can be one of the most powerful interventions to improve students' achievement" (Chapman, 1990, p. 5) and recognizing the importance of the curriculum developer's role within the educational system, the following section suggests types of information that would be helpful in monitoring and improving both curriculum policy decisions and the quality of curriculum development products.

WHO WANTS THE INFORMATION

In setting up an EMIS, one must have in mind these questions: who wants information, what kind of information do they need, will the information be used, and when? The "who" question is briefly discussed below because it can be addressed in general terms. The other questions will not be addressed here because their answers depend on the specific educational contexts in which they are being asked.

The types of potential users of information on the functions of a curriculum development sub-system could include the following:

1. **Educational policy makers at the educational system level.** Information on how educational sub-systems are functioning might have less relevance to "what" curriculum initiatives are desirable than relevance to "when" those initiatives will be implemented. Useful information for policy makers would be the present capabilities and capacities of the sub-system to adequately handle current work loads and the projected capabilities and capacities required to handle new curriculum initiatives.

2. **Educational planners at the educational system level.** When a new curriculum policy is to be implemented, educational planners must be able to project what that means in terms of costs to the system. The most accurate way for them to do so is to look at cost information about similar initiatives that have been implemented previously.

3. **Curriculum decision makers and planners within the curriculum development sub-system.** Executive officers and curriculum development officers within the sub-system, guided by system-level policy, must also make curriculum decisions and plans to implement that policy. Therefore, they especially require information about their capacity to implement policy so they can budget their resources accordingly.

4. **Project planners with donor agencies.** Project planners and developers within donor agencies must have a realistic understanding of the capacities of educational sub-systems. Making decisions based on this information might ensure that the initiatives and agreements made with client governments are realistic. It might also ensure that requisite resources are provided by the donor agency or the client government to guarantee a reasonable chance that the project will be fully implemented and that initiatives will be maintained after the life of the project.

5. **Project developers in the international community.** To understand why an educational initiative in one country succeeded or failed and to predict whether similar initiatives might be successful in other countries and contexts, one should have an understanding of the conditions under which the initiative was developed and implemented. Future projects targeted toward similar goals could be designed to ensure that conditions for success would be addressed.

COMPONENTS OF AN EMIS MODEL FOR CURRICULUM DEVELOPMENT SUB-SYSTEM

Chapman states, "An EMIS consists of components: (1) a specification of data needs; (2) selection of appropriate indicators; (3) a procedure for collecting, coding, and sorting the data; (4) a system for analysis (manual or computer-based); (5) personnel trained to conduct the analysis; and (6) personnel who can interpret the information after it has been analyzed and relate the results back to the questions and policy issues under discussion" (1990, p. 227). Because of the preliminary nature of this discussion, this section and the next are limited to the first and second components.

As a framework for listing the various categories of indicators, I have adapted the EMIS model used in Botswana which incorporates the components listed below. Because Botswana's EMIS model was designed to look at system-level components and the current discussion is looking at a specific sub-system, curriculum development, the definition of each of the components have necessarily been changed to reflect the environment and functions within which curriculum development operates.

Context. Context information is drawn from needs assessments and situational analyses that describe how the curriculum development sub-system relates to other factors in its operating environment. It identifies the current status of the sub-system in terms of its strengths, weaknesses, and constraints.

Inputs. Inputs are the resources available for curriculum design, development, production, and implementation. They also include human resources and their characteristics including those of curriculum development leaders, curriculum development officers, and officers in other components of the educational system (e.g., in service officers and school inspectors). Additionally, they include characteristics that are included in system-level EMIS including those of students, schools, teachers, headmasters, and instructional materials.

Process. Because curriculum development is, by definition, a process, this component should be regarded as the heart of a curriculum development sub-system. It includes the processes and functions required to transform system-level policy into curriculum reform, including existing and new educational technologies that are used to implement that reform through the design, development, and evaluation of curriculum materials and the implementation of those materials in the schools.

Outputs. Outputs are the direct and immediate effects or products of the curriculum development sub-system. These would include curriculum materials (e.g., student books and teacher's guides), methodologies required to teach the curriculum (e.g., child-centered approaches), pre-service and in-service teacher and officer training to implement the curriculum, and supplementary material and equipment requirements.

Outcomes. Educational outcomes are provided through the interaction of curriculum outputs with the school and social environment. Because a curriculum development sub-system is at the center of the educational system, its outcomes can be regarded as the outputs of the system as a whole. They include student achievement of learning objectives and associated attitudinal and behavioral changes. They may also include teacher skills, attitudes, and behaviors.

SUGGESTED INDICATORS OF CURRICULUM DEVELOPMENT EFFICIENCY AND EFFECTIVENESS

The following list of indicators of curriculum efficiency and the types of information that would be useful to curriculum development and implementation policy have been drawn from the current list of indicators of efficiency of Botswana's EMIS, recent studies of the organizational structure and functions of Botswana's Department of Curriculum Development and Evaluation, and relevant literature on large-scale educational projects and indicators of educational efficiency. The list should be considered as tentative and preliminary, pending further study and further input from other practitioners and researchers. No attempt has been made to place indicators in order of priority of importance or "worth."

Context

1. Officer characteristics including age, level of education, experience and other background;

2. Authority or decision-making structures including policy statements of where decisions are to be made and practical examples of where decisions actually occur;
3. Sources of support for curriculum development and implementation, e.g., in-service and pre-service support, transportation and production facilities, specialized expertise, private sector publishers' roles;

4. Educational philosophy and aims of the educational system;

5. Structure of the educational system as a whole, e.g., centralized vs. decentralized system;

6. Attitudes of personnel toward the curriculum development personnel and the roles they are to fulfill;

Input

1. Financial inputs including the sub-system's annual budget as well as more detailed budget information such as the proportion of the curriculum department's budget going toward the purchase of books/workbooks and supplementary materials, development of new materials and supplementary materials, inservicing of new materials and in-place materials, evaluation of materials, and "marketing" of new curriculum initiatives; officer salaries;

2. Sources of authority including authority to make curriculum decisions about changes in curriculum subjects, topics, skills, teaching methodologies, and time allocation per topic or subject area;

3. Officers' current capabilities and preparedness for curriculum tasks including understanding the following processes: conducting needs assessment, developing aims/goals/objectives, designing/developing curriculum, evaluating new curriculum, developing test systems for curriculum including test specifications, test blueprints, and test items, conducting summative evaluations, conducting research, managing educational projects, preparing and writing reports and official correspondence, writing instructional material, and preparing and conducting workshops;

4. The sub-system's human resource development capacity including number of training opportunities per year, availability of long term and short term plans for training; job descriptions, management approaches; training manuals, job aids, operational rules, regulations, and guidelines; career paths, employee turn-over; and utilization of clerical and other support staff;

5. Resources including number of officers per subject area, number of officer positions requested during previous year, number of officer positions allocated for current year; amount of professional reference materials that are accessible including books and periodicals, number of outside resource opportunities (e.g., workshops, speakers, conferences, exposure to systems outside of the state or country), availability of housing and other "perks" provided by the government, number of department vehicles and drivers available, types and numbers of production equipment (e.g., typewriters, computers, printers, copiers, cameras, staplers, paper) and percent of equipment that is operational at any given time;

6. Work environment indicators including how officers regard their jobs, their work environment, their preparedness to do their jobs, their effectiveness, the administration, and the effectiveness of their colleagues, and how all of the above compares with the environments of other departments; officers' regard for career paths and the current criteria for promotion and further training;

7. Contributions by outside agencies (donors, publishers, volunteer groups, communities, other government departments) including support in money, resources, expertise, transportation, equipment and training;

8. Availability of contextual information including characteristics of students and teachers for whom curriculum is being designed (e.g., student reading levels or teacher abilities to use a variety of methodologies); school teacher and administrator preparedness to implement new programs, their anxieties and concerns, and their roles as educational leaders; student performance on examinations; types of jobs available after schooling;

proportion of students going to further academic or vocational training or employment/unemployment after school; other demographic information on students;

9. Availability of planning information including the sub-system's mission and long range and short range goals with projected dates for achieving those goals and implementation plans and schedules; availability of policy documents specifying roles and responsibilities of the units within the department; the availability of planning documents such as school calendars, examination schedules, school visitation schedules, publishing guidelines, organizational charts;

10. Availability or utilization of communication and coordination mechanisms and structures to facilitate communication and formal linkages among ministries, departments, units, and donor agencies as well as more informal two-way communication among the officers across those organizations (e.g., curriculum coordinating committee, staff meeting schedules, workshop schedules);

Process

1. Planning functions including clarity about curriculum units' mission with the department, list of priorities in order of importance, existence of long and short range unit goals with projected dates for achieving goals, and implementation plans and schedules for achieving goals;

2. Time management including average number (per person) of sick days, personal leave days, days spent in meetings and workshops, days spent in work not directly related to producing curriculum materials within the officers' assigned subject areas; proportion of time spent in managing, coordinating, & communicating vs. writing, designing, & producing; proportion of time per year spent conducting one or more of the curriculum development tasks (listed under "Input"); time taken to develop new curriculum vs. adapting old curriculum vs. maintaining present curriculum; number of months/years it takes to develop a "year's worth" of curriculum materials for the various school levels;

3. Personnel management including the number of administrators and coordinators as well as support staff that are available per officer within the department; number of schools, students, teachers who are using curriculum products per subject area; identification of who controls and has the appropriate information for making curriculum decisions and who controls the budget for implementing decisions; the decision-making structure within units; officers' perceptions regarding the degree and adequacy of consultation and involvement in decision-making processes;

4. Communication including formal and informal mechanisms for internal unit coordination and communication among officers; intra- and interdepartmental communication opportunities for officers; frequency of correspondence and personal visits with school teachers, in service officers, and others; "routineness" of two-way communication with

other units and the teacher training system; degree of access to schools on an as needed basis; frequency of planning opportunities with other departments; timeliness of notification of training opportunities;

5. Implementation of curriculum development including the numbers of officers who have conducted various curriculum development tasks and processes (see "Input") and the amount of time spent conducting them;

6. Use of resources including the amount and unit cost of resources used and the patterns of use by officers;

7. Delivery of curriculum products including number of times production or delivery of materials was on time or postponed, percentage of times that materials were delivered according to official schedule or number of days delivery was delayed;

8. Capacity including number of development, production, delivery, and implementation efforts occurring simultaneously within a unit and within specific subject areas at any given time (e.g., development of books/workbooks/other subject materials, inservicing of materials, evaluation and revision of materials, and the conceptualization of new areas for development);

Output

1. Materials produced including books, supplementary materials, workbooks, teachers guides, and learning aids;

2. Workshops and training exercises conducted including formative evaluation and inservice workshops with teachers, headmasters, inservice officers, and inspectors;

3. Curriculum content including content analysis of materials to see if they contain what was intended;

4. Utility of curriculum material and assessment including how syllabuses, materials, guides, and assessments are functioning and are being used;

5. Curriculum dissemination, diffusion, and institutionalization including indicators that curriculum will remain functional within the school context in terms of student access to materials, teacher use of appropriate teaching methods, quality of teacher training, supervisor and administrator training, material distribution and replacement systems, record keeping and reporting systems;

Outcome

1. Student achievement/attainment including school enrollments, number of students setting for school leaving examinations, percentage of students completing basic education cycle, and percentage of students achieving examination results at various levels of performance.

Summary

More educational system performance research should be directed toward curriculum development processes and the capabilities of curriculum development sub-systems. With the information provided by such research, practitioners would not only be able to monitor and improve the efficiency of curriculum development processes being used but would also be able to facilitate the institutionalization of those processes better. To date, educational system performance research has begun considering school-level data in addition to national-level data in an effort to study what makes education more efficient and effective. While both levels of data collection are useful in providing a more comprehensive picture of educational systems performance, the processes that are used to develop a functional curriculum to address national and community educational needs seem to have been overlooked.

This discussion has been an attempt to address the oversight and to suggest the types of information that might be useful in monitoring and improving the efficiency and effectiveness of curriculum development and implementation sub-systems.

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6

The Impact of Sectoral Adjustment on the Design and Implementation of an Educational Management Information System: The Case of Guinea

Joshua Muskin

By the start of the 1990s, sectoral adjustment has clearly caught on as a prominent *modus operandi* of USAID and, particularly, World Bank assistance programs. Funds are released to governments in a sequence of tranches (or partial allocations) only after a set of pre-determined, jointly accepted conditions or targets are met.[1] These tranche-release conditionalities regularly include a mix of obligations such as the adoption of policies, the implementation of studies, and the achievement of targets that the donor, and apparently the beneficiary, believe will promote fundamental positive changes in the sector receiving support and, consequently, in the broader, macro-economic/social welfare context. The critical aspect of the process is, then, not the satisfaction of the conditionality requirements—which serve primarily as monitoring or tracking tools—but the articulation and implementation of a coherent comprehensive strategy of reform. The risk is that, once the objectives of the program are set within a conditionality framework, attention may be diverted away from the implementation strategy to a more mechanical, narrowly focused effort to meet the specific conditionality targets. In this manner, the targets are met to the detriment of the program objectives.

In 1990, the Government of Guinea undertook a sectoral adjustment program for its education sector, the *Programme d'Ajustement Sectoriel de l'Education* (PASE). This program was the result of a process initiated by Guinea in 1984 at a national education conference. The World Bank, The United States Agency for International Development (USAID) and the French Government's *Fond d'Aide et de Coopération* (FAC) have collaborated to assist the Government of Guinea in further refining and implementing a reform program to improve the quality, access and management of all levels of its national education system. Given the profoundly underdeveloped nature of Guinea's education sector—e.g., with a 28% gross national enrollment rate (18% in rural areas) and a per student annual expenditure on materials of just $0.20—the foundation of the World Bank and USAID participation targeted particularly the aims of

[1] The contention that the conditions are articulated and agreed upon through a negotiated process involving two co-equal partners is defended strongly by the World Bank and USAID. This belief is refuted with similar conviction by their African government counterparts. These officials perceive the power of the Bank as lender or USAID as grantor to represent an inordinate amount of influence in setting the conditions for their countries' sectoral adjustment programs. They acquiesce to the conditions in order to receive much-needed loans and grants.

increasing the flow of resources to the school and assuring their rational utilization. More specifically, these concerns included facilitating and accounting for the flow of resources (material, human and financial) from the central authorities to regional, or prefectural, education offices and, ultimately, to individual schools. The French are participating in the PASE primarily in the area of teacher training.

Several conditionalities have been accepted by the Government of Guinea in negotiations with the donors, reflecting a joint commitment to promoting and executing Guinea's national education reform agenda. The targets identified in the conditionalities have been formulated to help guide and monitor progress in the different areas of this program. These conditionalities must be met before any of the donors approve subsequent dollar tranche releases.

USAID has contracted Florida State University (FSU) to provide technical assistance in the areas of finance and administration to support the Ministry of Education in establishing management information collection, analysis and reporting systems. The identification and design of these complementary, often overlapping, systems is intended to support the development of a technical capacity within the Ministry of National Education to administer the operations and finances of the sector. A schedule has been agreed upon by the Government and USAID to evaluate the program, a "conditionalities review," at three times over the life of the present program: (The same schedule has been adopted by the other donors, although each has set its own dates for this with the Government.) With each successive evaluation, a new set of targets will be assessed. If met, these are intended to represent further advancement by the PASE and the Government towards meeting the overall reform objectives.

During the first phase of the program, the overall goal of the USAID-Guinea conditionalities is to assure that political and structural frameworks exist for the program's implementation. Additionally, plans are required of the Government of Guinea for meeting basic long-term objectives, including the presentation of a set of baseline data against which to assess progress.

The second phase evaluation focuses more precisely on actual changes in Ministry policies and practices and on the Government's real commitment (in dollars and personnel) to the education sector. This is represented in targets such as: (1) an increase in the proportion of total Government expenditures allocated to the education sector; (2) evidence of an increased portion of Ministry of Education expenditures going to recurrent budget items, from 14 to 17 percent; and (3) the existence of a plan for achieving the equitable participation of girls and rural students in schools nationwide.

The third and final release of USAID funds to the Government in support of the PASE reform efforts is tied mainly to evidence of further progress in the same areas addressed in the second evaluation. By this time, the proportion of recurrent Government expenditures on education must have reached a target of 21 percent. Further evidence must also be provided of reasonable progress toward the targets specified in the plans for gender and regional equity, evident in

school construction and rehabilitation budgets, teacher assignments, salary and non-salary annual recurrent expenditures, and girls' and regional enrollment rates.

As stated above, the different conditionalities have been selected to indicate specific, more profound advances in the national education reform process. This is demonstrated generally in two ways. First, a positive evaluation should show that the objectives of the reform effort are being met; e.g., that the distribution and management of human and material resources are occurring as planned, generating the anticipated improvements in school quality and equitable access. Second, a successful evaluation is understood to serve as evidence of the Ministry of Education's improved capacity as an institution and of its staff's heightened ability to administer and implement Guinea's schools.

The conditionalities agreed upon between USAID and the Government of Guinea reflect those agreed upon between the Government and the World Bank, whose involvement in the education reform program preceded that of USAID. (The different donors, including the French, do attempt to assure consistency in their different programs, such as with the occurrence of a weekly donors/PASE meeting, but collaboration and agreement is rarely as easy as conversation.) The first priority for the Bank's program was to receive a statement by the Government committing itself to a comprehensive outline for the reform of the country's national education policy and practice. Various committees, comprised of members who are both directly and indirectly affected by the sectoral adjustment program, have been formed to constitute a political, administrative framework for the PASE. Also included at this initial stage are (i) an internal reorganization of the Ministry of National Education/State Secretariate for Pre-University Education (MEN/SEEPU)[1] and (ii) the establishment and operation of regular monitoring procedures within the MEN/SEEPU for both budget allocations and actual expenditures in the education and training sector. Additional conditionalities involve a combination of quantitative targets—for education staff redeployment, proportional Government budget allocations to and within the sector, and efficiency measures—and more specific structural strategies—for introducing a computerized personnel management system and for preparing and executing rationalization plans for post-secondary and technical education.

Both the World Bank's and USAID's conditionalities attempt to achieve two major objectives: (1) to establish an equitable, efficient allocation of resources among Guinea's education sub-sectors and target populations; and (2) to assure the existence of valid, consistent, "transparent" accounting and reporting procedures that will reveal the level of success in meeting objective one. The related targets, strategies and structures are articulated in a manner that reflects a mutual assumption that the mechanisms and resources brought to bear to satisfy the specific conditionalities will yield positive permanent effects that will endure well beyond the life of the program. In particular, program success depends on the fulfillment of a few expectations, or hopes:

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[1] SEEPU was named an independent Ministry as of February, 1992.

i. **Expenditure patterns employed by the Government and the Ministry of Education established during the life of the program will carry over to the post-program period** (an explicit assumption). The level and proportional allocation of expenditures agreed upon between the Government of Guinea and the World Bank and USAID, and (a crucial point) permitted by the temporary untied funding paid straight into the Treasury by these two donors, are expected to be sustained after the external financial support ends. The donors justify this assumption in a few ways. For one, they assert that adequate finances will exist in the country's coffers after 1996. The Bank's projections of the Guinean economy indicate that national growth in exports and production will compensate for any shortfalls resulting from the end of outside funding. Further confidence derives from the proposal that once the new spending patterns are established within the Government system, they will be largely intractable, due to a combination of institutional habit and the collective expectations of the various affected client parties—students, parents, teachers, prefectures,...

ii. **Expenditure targets and other measures reflected by the conditionalities will yield improvements in the quality of the education provided by the system** (an implicit and explicit assumption). This proposition appears to be valid insofar as the program results in increased access to schooling for presently excluded groups, with new school construction and rehabilitation programs, staff redeployment and revised spending plans. Program provisions mandate that the proportion of the total recurrent costs allocated to primary education in the second year of the PASE be at least 34 percent of the total national education budget. (This category has already reached 35 percent.) The proportion of non-salary recurrent spending should reach at least 17 percent by the end of year two, and 21 percent by the program's end. (The 21 percent target has also already been achieved.) Per primary student non-salary annual expenditures are mandated to increase from about $0.20 to about $4.00 in the first year and maintained over the reform's life. As the PASE implements systems that assure that more money go to pedagogical purposes and as this money is distributed more equitably throughout the country, heightened quality is anticipated. This is particularly expected as these expenditures are associated with proposed improvements in pedagogical programs introduced with the aid of FAC—providing teacher training programs —, and the World Bank—promoting a multi-grade classroom strategy, especially in rural areas to increase enrollments.

iii. **The ability of the Ministry of Education to report on conditionalities will indicate an increased capacity for carrying out appropriate, established monitoring procedures and the existence of viable systems within the Ministry for operating the national education system outside of the PASE context** (an implicit assumption). The reporting requirements associated with World Bank and USAID conditionalities involve the performance of many functions—e.g., line item budgeting, presentation of receipts and other spending documentation by local

prefectural education offices, and national accounting reports —, that the Ministry is presently poorly equipped to undertake.[1] Neither the necessary professional capacity nor appropriate systems or procedures for doing this exist. With the institution of new administrative structures and procedures and with the practice of reporting comprehensive education data within the donor review framework, it is anticipated, finally, that the Ministry of Education will have embraced and mastered both the idea and the practice of data-based management and decision-making by program's end in 1996.

Some of these assumptions permit greater opportunity for confidence than do others, but none is guaranteed. Rather, each must be analyzed carefully, asking if the reporting systems and the actual quantitative and institutional targets articulated in the PASE conditionalities will truly effect lasting reforms in school quality and in accounting for and reporting cash and materials flows within the education sector. A key consideration in this determination is the direct intention of the design and implementation of the prescribed financial and administration systems, policies and targets. For example, the accelerated achievement of spending percentage targets indicated above is attributable primarily to increased tertiary level expenditures; yet the purpose of these targets was to raise the level of primary school inputs.

It must be asked, are the strategies and policies chosen primarily to meet short-range conditionality indicators or has there been a purposeful, thoughtful effort to effect lasting improvements in the efficiency and quality of the administration of the national education system? More simply, it can be asked if the individual assumptions have a legitimate chance of becoming reality, regardless of the design and execution of the program. This concern is particularly meaningful as it relates to what can only truthfully be considered a wishful assumption (#1) that donor-supported expenditure levels within the Ministry will persist after the end of the program.

The priority given by the World Bank in its program to the creation of committees and an internal reorganization of the MEN and MEPU administration seems obviously formulated to address more long-term, capacity-building aims of the PASE. The use of conditionalities represents, in this instance, a more far-reaching joint initiative (involving USAID and the FAC) to provide technical assistance that should help galvanize the Guineans ability to administer their education system. Satisfying the conditionalities is intended to be basically a secondary, or even somewhat symbolic goal, one that is demonstrative of the more fundamental objectives of the sectoral reform process. Were it different, simply a matter of satisfying the targets enumerated in the respective USAID and World Bank conditionalities, the permanent impact of the PASE would be much more doubtful. In this manner, more confidence can be afforded in considering assumption number 3.

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[1] Given the fact that three years ago, the sector did not even operate with a budget, the critical need for this support is very understandable; thus USAID's emphasis in this area.

Looking specifically at the USAID contribution, the primary concerns are (1) to identify the prominent technical needs of the MEN/SEEPU in the areas of finance and administration and (2) to design and implement a comprehensive strategy to address these. In this manner, satisfaction of the conditionalities are perceived as a consequence of addressing the long-term capacity and systemic requirements of the national education system, not as the ultimate goal. Clearly, when progress review periods arrive, the associated Ministry and Project staff pay special attention to prepare, deliver and defend the required documentation demonstrating satisfaction of the various conditionalities. But the plan is that it will be increasingly possible to rely upon existing, competent systems and personnel for the routine preparation of these and other similar reports. (This has not been the case for either of the first two conditionality reporting exercises.)

The proposed configuration of the FSU/USAID technical assistance program includes two long-term technical advisors and about 30 person-months of short-term consultants to be used over the two-year life of the FSU/USAID Project (USAID is presently committed to a full five-year program) in various areas of education finance and administration. The position of Principal Technical Advisor (PTA) has been designated to sit within the Technical Secretariat of the PASE, collaborating with the PASE National Coordinator and the FAC Technical Assistant for Adjustment to articulate and assure the proper implementation of systems and policies for an effective, comprehensive Guinean education reform.

Working in the areas of finance and administration, FSU/USAID is concerned most prominently with the work of the DAAFs and SAAFs (*Directions* and *Services des Affaires Administratives et Financières*). The two DAAFs serve as the central authority overseeing the MEN's and MEPU's entire financial and administrative affairs and are located in Conakry. These offices are the most directly affected by the PASE reforms and, consequently, their work relates most closely to the conditionalities. The SAAFs serve essentially as prefectural satellite units of the DAAFs. Their major functions are to serve as the link between the DAAFs and the schools, managing and monitoring the distribution of resources to the schools and reporting on these activities back to the DAAFs. The specific responsibilities and functions residing within the DAAFs are essentially:

- to prepare the annual education budget for submission to the Ministry of Finance;
- to manage the expenditure of the budget, assuring that the monies are assigned and disbursed properly, according to plan;
- to assign and manage the administrative and teaching personnel of the national education system;
- to manage the equipment, materials and properties of the MEN and SEEPU, including the implementation of renovation and new construction activities; and

- to account for the various resources (financial, material and human) of the national education system.

The FSU/USAID program of technical assistance to the PASE covers all aspects of this list. In addition to the two resident technical advisors (one of whom has been in place since September, 1991, the other arriving in June, 1992), a relatively lengthy list of short-term expertise is planned for the areas of budgeting, procurement and tendering, properties control, materials management, management information systems, computerization, management training, and internal audit. Two areas that do not fall directly within the rubric of finance and administration but found within the USAID areas of responsibility and covered by the conditionalities are also covered by the short-term consultant plan: monitoring and evaluation, and gender and regional equity in school access. The PASE may identify other needs for related technical expertise as the program develops.

The Project plan is to inject the different technical experts into the overall program at strategic times to build up the overall capacity of the MEN/SEEPU to manage and administer Guinea's national education system. FSU/USAID has identified a strategy (continuously being refined with further reflection and evolving contextual developments) that assigns to the series of technical experts three basic tasks:

1. analyze current systems, levels of competence and needs associated with the particular areas of expertise operating within the DAAFs and SAAFs;

2. identify strategies, systems and a training agenda, and prepare appropriate documentation, with the aim of upgrading the individual and systemic capabilities of the MEN/SEEPU; and

3. initiate the implementation of the articulated measures, procedures and policies, undertaking regular monitoring and evaluation efforts.

As suggested above, it is possible to report the status of the conditionality indicators with a functional, or "punctual," intervention without engaging in this manner of capacity-building strategy. A technical expert could easily collaborate with his or her highly placed Guinean counterpart(s) to gather any necessary documents and prepare various reports alone, with minimal input and participation from the associated Guinean staff who will eventually be charged with the routine preparation of such data and documents. Similarly, the various committees and new institutional structures included among the Bank's conditionalities could be created that serve little more than symbolic purposes. Budget levels could be raised, teachers could be redeployed, and schools could be built and renovated, all achieved and reported satisfactorily without instigating if any real fundamental improvements in either the quality and coverage of the education system or the ability of the Ministry of Education to administer the sector have occurred.

The 1992 annual budget exercise of the MEN/SEEPU exemplifies the first of these caveats. The elaboration of this budget for submission to the Ministry of Finance coincided directly with the arrival of two FSU/USAID technical assistants. The budget's preparation involved essentially a scramble by five people—the two Guinean Directors of the DAAFs and three technical advisors (the two FSU/USAID consultants and one from the World Bank)—to gather all the necessary documentation and prepare an official report. This process only resembled vaguely a formal budget preparation process, one involving systematized analysis and submission of documentation from the many different levels of the education system. There surely remains much progress to be made before the Guineans are able to take over this process independently as a routine task. This is particularly true of the collection and submission of documentation by schools and administrators at the prefectural level.

The tranche review process provides perhaps an even more acute example of the dangerous potential to satisfy sectoral adjustment conditionalities without effecting an enduring impact upon the ability of the targeted institution to satisfy routine finance and administration duties. As argued above, if it were just a matter of meeting this discrete set of targets, this could be achieved with little impact upon national technical or institutional ability. An expatriate team could effectively guide the PASE process in an essentially mechanical way—assuming an agreeable or pliant political will—to prepare the necessary reports, organize the prescribed committees, and plan and execute the various reforms (e.g., expenditure allocations, redeployment, school construction) delineated in the conditionalities. The review process would be satisfied and the subsequent tranche could be released. The ultimate goal is, however, that this information will be available systematically from a variety of different ministerial DAAF units engaging many different Guinean staff and administrators. The World Bank's adherence to this approach is reflected in their insistence upon a postponement of their tranche review mission from its original November dates to February, when the Government of Guinea indicated that it would be ready for the evaluation.

In a certain way, the demands placed upon the system by the conditionalities reporting process can be seen to obstruct the capacity-building and systems development aspects of the PASE. Quite practically, the level of effort and time required to prepare three different sets of conditionality documents (one each for the World Bank, USAID and FAC) leaves relatively little time for a planned program of technical support to the DAAFs and SAAFs. Taking this year as an example, starting in early September, the DAAFs and the PASE (including the expatriate assistants), were engaged fully in trying simultaneously to prepare the Ministry's annual budget submission and the conditionalities report for the World Bank's second tranche review, scheduled for early November. Due to the Ministry's request for an extension, the review was put off until February, while the DAAFs and the PASE continued to expend much, if not most, of their effort to gather and prepare the necessary information. The result of the Bank's review was a conditional approval, contingent upon the presentation of more documentation. This process took about another month and a half, overlapping with efforts to prepare the documentation for USAID's upcoming tranche review in June. This is apparently a less involved process, but a similar evaluation conducted recently in Namibia resulted in an

additional 60 days of work to the Ministry officials. And then there is the French review, which should be much more relaxed.

Expatriate resident experts, donor officials, and Ministry administrators and managers are required to operate in a crisis mode to prepare documents for the discrete targets of the particular tranche review. Consequently, this also detracts from the Ministries' execution of the routine reporting procedures placed upon them by the Government. First, the tranche review process skews the information the Ministries gather to ends defined by the sectoral adjustment program, rather than to comprehensive operational needs (although the two are meant to be compatible). Second, as exemplified above, the tranche review process simply absorbs an exorbitant number of Ministry and technical assistance person-hours to permit a rational schedule of joint capacity-building and routine management and reporting. This is hardly a mode of operation which the donors would choose purposefully to transfer to MEN and MEPU managers and technical staff.

In both the World Bank's and USAID's programs, as for other donors, there is a fundamental risk that excessive attention will be paid to the conditionalities, to the detriment of the objectives which these are intended to represent. In this situation, satisfactory tranche review outcomes might be inaccurately interpreted as an improved ministerial ability to implement an enduring reform program. This possibility should not be underestimated.

The FSU/USAID program takes precautions against this risk by not accepting an exclusively report-based approach to its Project. The principal focus, as stated above, is to create an institutional capacity for reporting, along with a mastery of all of the associated preliminary and subsequent managerial and financial functions: a comprehensive management information system (MIS). In addition to the design and development of a series of financial and administrative systems and procedures for the areas identified above, the capacity-building process will involve the following activities, among others:

- an *ad hoc* and, eventually, an institutionalized consultative process involving affected Guinean administrators and technicians to inform the MIS design, development and evaluation process and to contribute to each of the three subsequent activities;

- the development of a series of operational manuals, guidelines and policies for each of the DAAF and SAAF functions;

- the introduction of new technology (equipment and systems) selected to facilitate the work of the DAAFs and SAAFs, increasing the accuracy and efficiency of these offices; and

- the design and implementation of a series of training activities, including individual sessions or extended programs of topic-specific training, on-going apprentice-type transfer of skills, and counterpart collaboration with outside technical experts, to

enable the various staff to master and take advantage of the new, improved software and hardware.

At this early stage of the assistance program, it appears that the strategies and support undertaken by the Bank and USAID to meet conditionality objectives are successful targeting more long-term, capacity-building, structural issues. As has been argued, this situation is not, however, a necessary outcome of pursuing and reporting the conditionalities. Rather, it must result from a purposeful effort by the donors to establish *bona fide* finance and administration systems that will assure the manner of reporting required of a fully operational national education system and only secondarily for the tranche review process. The Guinea case shows that EMIS planners must consider very strongly not only a system's information requirements but also the contextual framework in which the system will operate, sectoral adjustment objectives notwithstanding, to create a permanent improved management capacity that is able, if indeed truly willing, to implement and maintain a meaningful, lasting reform.